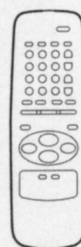
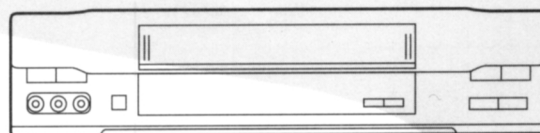


# TOSHIBA

FILE NO. 110-9522

## SERVICE MANUAL

# VIDEO CASSETTE RECORDER ***V-705W***

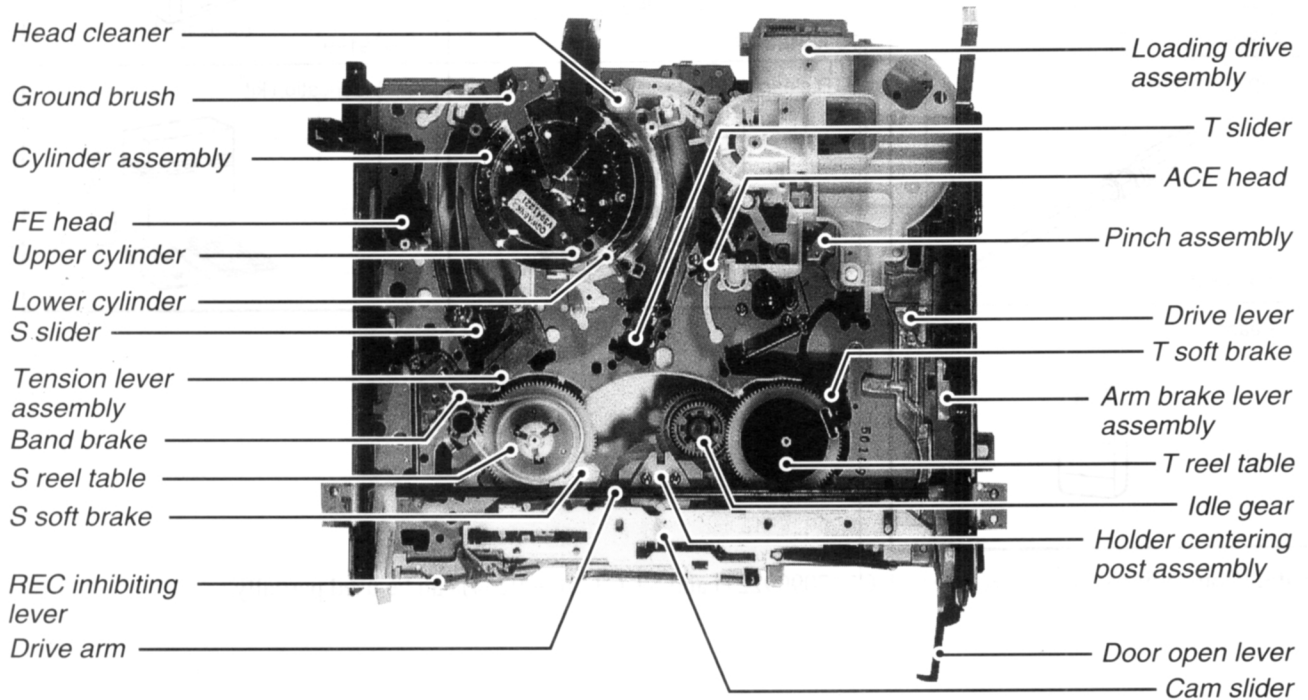
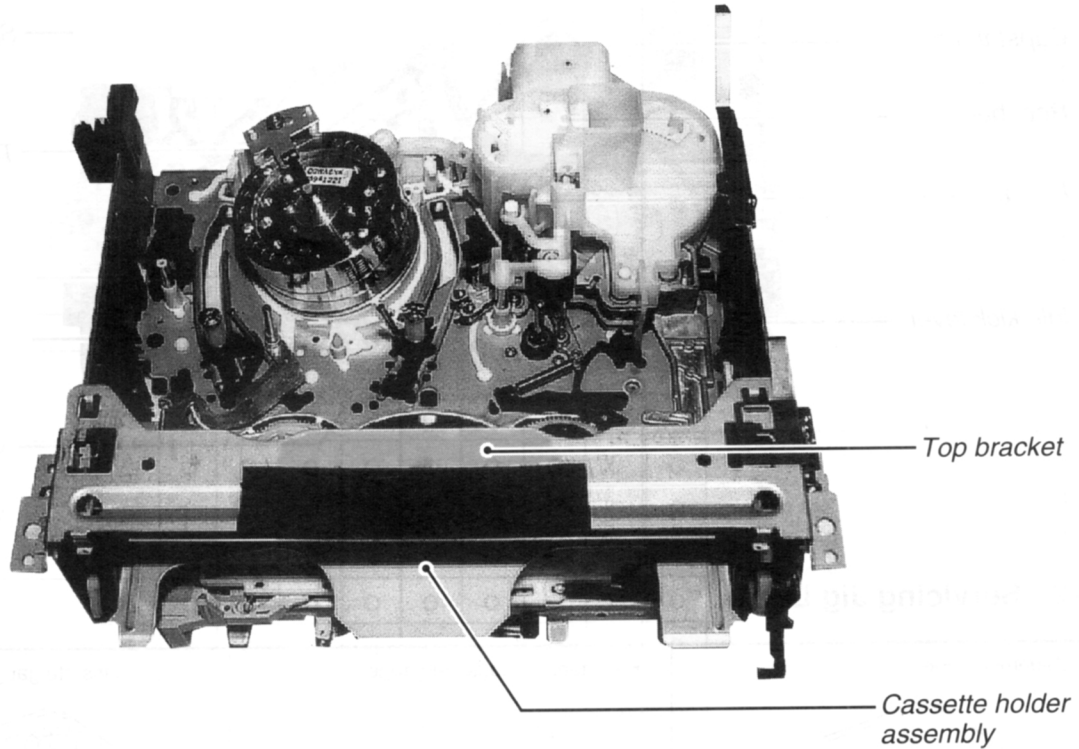


# SECTION 2

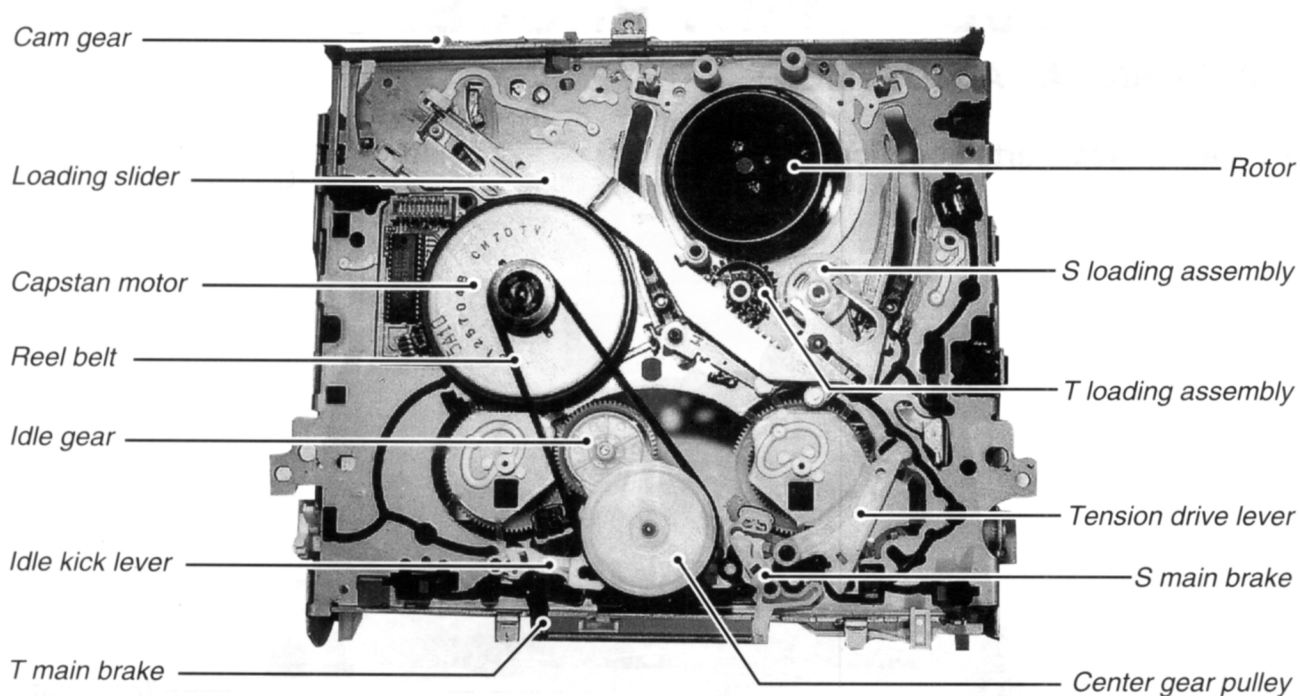
## ADJUSTMENT PROCEDURES

### 1. MECHANICAL ADJUSTMENT

#### 1-1. Mechanical Parts Location

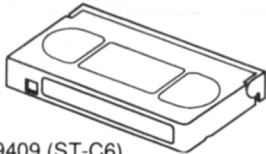
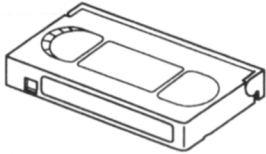
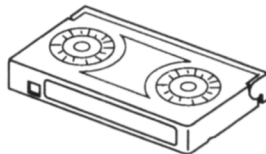
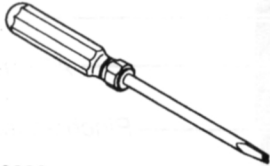
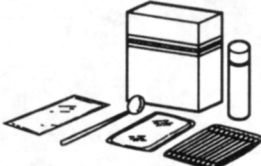




Top View



**Bottom View**

## 1-2. Servicing Jig List

<p>Alignment tape</p>  <p>70909409 (ST-C6) 70909410 (ST-C7)</p>	<p>Back tension cassette gauge</p>  <p>70909103</p>	<p>Torque cassette gauge (KT-300NR)</p>  <p>70909199</p>
<p>Taper nut driver</p>  <p>70909228</p>	<p>VTR cleaning kit</p> 	<p>VTR lubrication kit</p> 
<p>Grease</p> 		

**Note:** Conventional alignment tapes ST-C1 (70909227) and ST-C3 (70909264) can be used partially.

### 1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Service time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension post											<ul style="list-style-type: none"> <li>• When cleaning, use a swab or piece of gauze soaked in alcohol.</li> <li>• After cleaning, cleaned parts are dried completely, and then load a video cassette.</li> </ul>
	S/T slant guide post											
	Impedance roller *											
	No. 8 guide post	△	△	△	△	△	△	△	△	△	△	
	Capstan											
	No. 9 guide post											
	No. 3 guide post											
	S/T guide roller	△	△	△	○	○	○	○	○	○	○	<ul style="list-style-type: none"> <li>• When lubricating, always use the specified oil.</li> </ul>
	Upper cylinder	△	○	○	○	○	○	○	○	○	○	
	Slip ring assembly		○	○	○	○	○	○	○	○	○	<ul style="list-style-type: none"> <li>• When the lubricating, apply one or two drops of oil after the cleaning with alcohol.</li> </ul>
	FE head	△	△	△	○	○	○	○	○	○	○	
	ACE head	△	○	○	○	○	○	○	○	○	○	
	Pinch roller	△	○	○	○	○	○	○	○	○	○	
Tape Drive System	Capstan motor	△	△	△	△	△	○	○	○	○	○	<ul style="list-style-type: none"> <li>• Check the back tension.</li> </ul>
	Loading motor				○	○	○	○	○	○	○	
	Loading belt/ Reel belt	△	○	○	○	○	○	○	○	○	○	
	S reel table assembly		○	○	○	○	○	○	○	○	○	
	T reel table assembly		○	○	○	○	○	○	○	○	○	
	Idle gear assembly	△	○	○	○	○	○	○	○	○	○	
Other	Band brake assembly		○		○		○		○		○	

△ : Cleaning    ○ : Check and replace if necessary

\* There are two types. One type has an impedance roller and another type has no impedance roller.



## 1-4. V3 Mechanism Check Method

If the abnormal condition is caused by the mechanism itself, analyze the cause according to the following procedures.

### 1-4-1. External Appearance Check

- (1) Check whether there are foreign matters or not inside the VTR.
- (2) Check whether the cylinder and the guides for tape transport system are contaminated.

### 1-4-2. Motor Sensor System Check

Check whether some abnormalities are found in the motor or the sensor system (including control circuits) according to the flow chart.

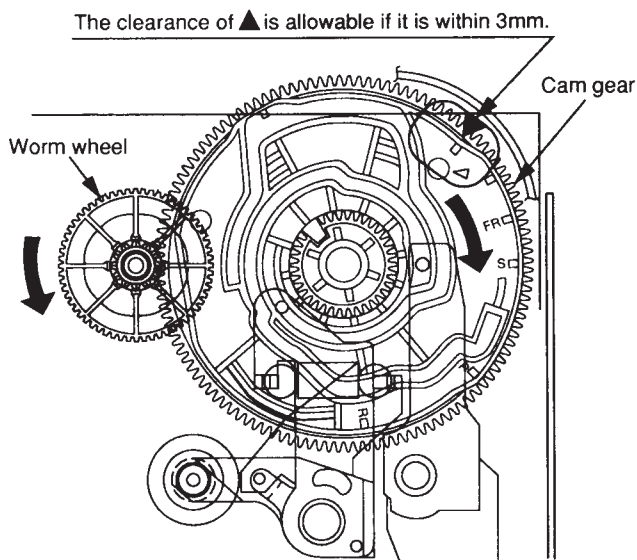
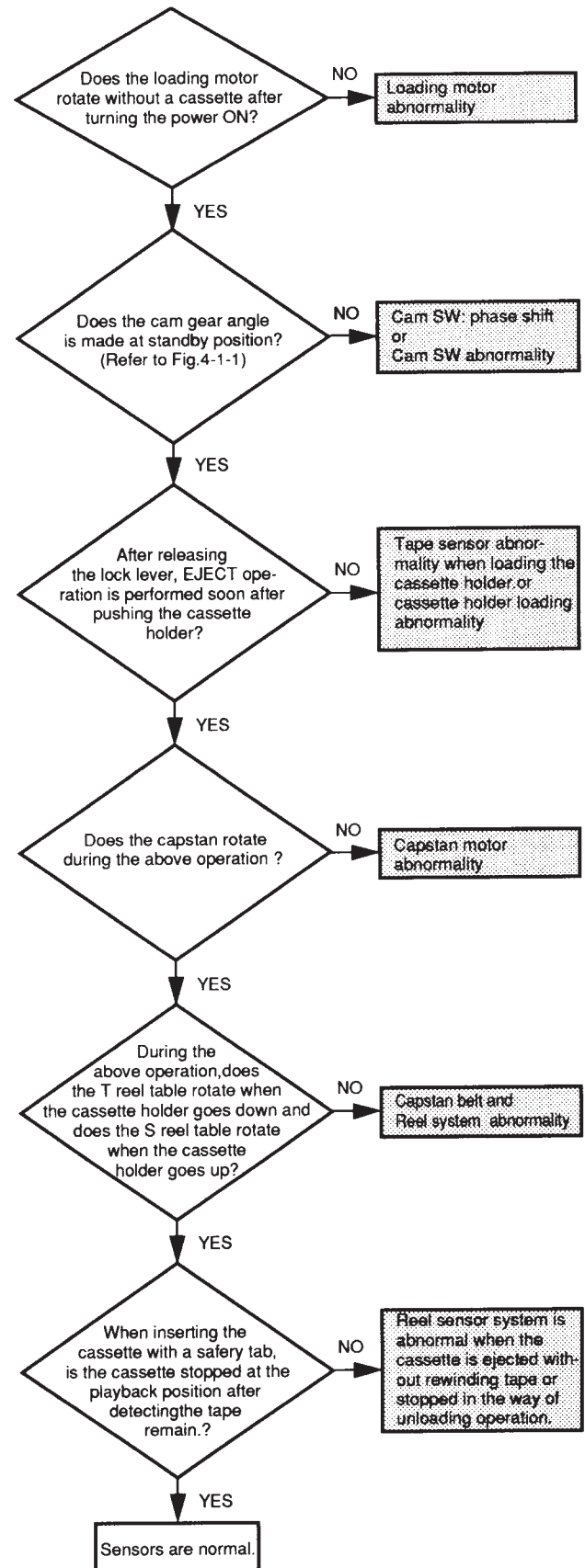


Fig. 4-1-1



### 1-4-3. Abnormality Analysis by Self-check Function

The unit used V3 mechanism has a self-check function. The self-check function works as a system which stored some abnormal condition. So, use this function to try to analyze the cause(s).

For the data display method and the content of the data, refer to the self-check function (described on page 2-47) in item 2-3.

#### Note:

- Abnormal data is displayed only when the first abnormal condition occurs, and is not displayed in the second time. Accordingly, the claim from customers and the actual data displayed may be different.
- The data is stored only when the power turns off after occurring the abnormality condition(s). The data is not stored when the unit operation is recovered by the microcomputer.
- After repairing, initialize the data by pressing the [COUNTER RESET] button while displaying the abnormal mode.

The typical examples in abnormal condition are shown below.

Table 4-3-1

A	B	C	Abnormal Condition	Check Item
06	01	09	Cylinder is stopped at playback position during playback the tape.	} Check the cylinder motor. Check if the cylinder and tape transport guide are clogged.
02	01	0d	Cylinder is stopped at FF/REW position during rewind the tape.	
06	02	09	T reel sensor is abnormal at playback position during playback the tape.	} Check the capstan motor. Refer to the cases 2 and 3 describe on the table "Defective analyzing list".
03	03	07	S reel sensor is abnormal at playback position during REVIEW the tape.	
01	04	02	Cassette-in and out operation cannot be performed.	} Refer to the case 1 described on the table "Defective analyzing list".
03	05	08	Mode shift cannot be performed during shifting to REVIEW.	

A: System control mode, B: Abnormality No., C: Mechanical position when an abnormality occurs.

### 1-4-4. Check by Defective Analyzing List

If the abnormality causes the mechanism abnormal condition, presume, confirm and treat the defective according to the "Defective analyzing list" in table 4-4-1.

#### (1) Manual mechanism operation (mode shift) method

Push in the lock lever R and L manually and turn the worm wheel counterclockwise as shown in Fig. 4-1-1. The cam gear is turned clockwise and the mode shifts to the direction where the loading operation can be performed. So, check the mechanism condition in the defective mechanism position when the abnormality occurs.

#### (2) Defective parts replacement

When a defective occurs due to the defective part(s) and the part(s) is replaced, take care the following items.

- Especially as for the mechanical parts requiring the phase alignment, take care of the part replacement E.g.. Assembling mode, phase alignment mark and etc.

- As for the part(s) requiring lubricant such as a specified amount of oil or grease, apply grease or oil according to the instructions and do not stick grease or oil to the portions without allowing to stick it (especially in removal and assembly).

#### (3) Check after treating the defective

After replacing a defective part and/or aligning a part, first check the mechanism operation manually and confirm that no problem occurs, and then mount the mechanical deck, turn the power ON and check the mechanism operation.

#### Note:

- After replacing the defective parts according to the procedure of the treatment method for the "damage and phase shift of mechanical part", check the operation of the mechanism again, since the same (or similar) defective problem may occur due to other serious cause (in mechanism or electrical circuit) when performing the actual total check with turning the power on.

**Table 4-4-1 Defective Analyzing List**

Case	Defective Phenomenon (Main Items)	Presumed Cause (Main Cause)	Check Method
1	Power does not turn on. Loading operation is defective. Mode shift operation is defective.	<General> Mechanical stops due to mechanical phase unmatching.	Check mode shift "Cassette out FF/REW position" can be performed when turning worm wheel.
	Loading operation is not performed.	Loading motor does not rotate. (Loading motor is defective or circuit is defective.)	Check loading motor whether it turns by the outer power supply (12.5V).
	Unloading operation is not performed.	S reel does not wind the tape.	Refer to case 3 in this table.
2	Playback operation is not performed. Playback operation is defective.	<General> Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
	Playback picture does not appear. Video recording can not be performed.	<In case of no mechanical problem> Cylinder is defective. (Circuit is defective.)	Check cylinder assembly.
3	Playback interruption. Defective phenomenon during playback. Recording interruption.	Reel rotation detection is defective. (Sensor is defective. Circuit is defective.)	Check sensor output.
		Idler does not swing.	Check mechanical position.
		Reel belt is removed.	Check the reel belt is removed or not.
4	FF operation is not performed. FF operation is defective. REW operation is not performed. REW operation is defective. Others: REV/FF is not performed. Others: REV/FF is defective.	Main brake is not released. (ON) T soft brake is not released. (ON) Idler does not swing. Pinch is not released.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
5	REVIEW is not performed.	Main brake is not released. (ON) T soft brake is not actuated. Idler does not turn. Pinch does not press.	Check mechanical position.
		Capstan motor does not rotate. (Capstan motor is defective or circuit is defective.)	Check capstan motor.
6	Slot-in is not performed. Cassette can not be inserted.	<General> When the F/L is mounted on the mechanical deck, the position is not correct.	Check mechanical position.
7	Capstan servo does not work. Capstan servo is uneven. Tape speed is fast. Tape speed is slow. Tape speed is uneven. FG pulse is not output.	Capstan motor is defective.	Check capstan motor.
		ACE head control output is defective. (Circuit is defective.)	Check ACE head. Check CTL output.
8	Audio output does not come out. Audio output is small. Audio output variation is large. Audio output is uneven. Audio distortion. Audio noise. Others: Audio is defective.	ACE head is defective.	Check ACE head. Check CTL output.
		Tape transport adjustment is not defective.	Perform tape transport adjustment again after confirming tape transport condition.
		Hi-Fi head (cylinder) is defective. (Circuit is defective.)	Check cylinder. Check whether B+14V is supplied.

Treatment: If the mechanical is found out to be defective according to the procedures described above, perform the following treatment.

•Misassembling, mechanical phase mismatch .....Repair correctly.

•Parts defect, parts damage.....Replace parts.

If the mechanical is found out not to be defective according to the procedures above, check the circuit(s).

## 1-5. Mechanical Deck Removal and Mounting

### 1-5-1. Mechanical Deck Removal

1. Remove three screws (2) mounting the top cover (1) and remove two screws (3) mounting the chassis and remove the top cover sliding backward and lifting upward.
2. Remove two screws (4) and remove the front panel (5).
3. Remove FFC (8) connecting between main unit (6) and KDB unit (7), lead wire (11) connecting between terminal unit (9) and FCB unit (10). Remove lead wire (14) between a mechanical deck (12) and FCB unit (10) by loosening screw (13).

#### Note:

In this case, remove FFC (8) on KDB unit (7) side, lead wire (11) on FCB unit (10) side and lead wire (14) on mechanical deck (12) side.

4. Remove two screws (15) and power unit (16).

5. Remove two screws (17) and a screw (18) securing the mechanical deck (12).
6. Remove the claw securing the main unit (6).
7. Remove the mechanical deck (12) with the main unit (6) from the chassis lifting the terminal board (20) slightly and pulling the top bracket (19) upward.

#### Note:

When pulling the top bracket upward, take care not to deform the reinforcement plate located below the F/L assembly.

8. Remove the lead wire connecting between the mechanical deck (12) and the main unit (6) or terminal unit (9).
9. Turn over the mechanical deck (12).
10. Remove the reel belt (21) and one screw (22).
11. Remove four claws securing the mechanical deck (12) and the main unit (6), and then remove the main unit (6) pulling upward.

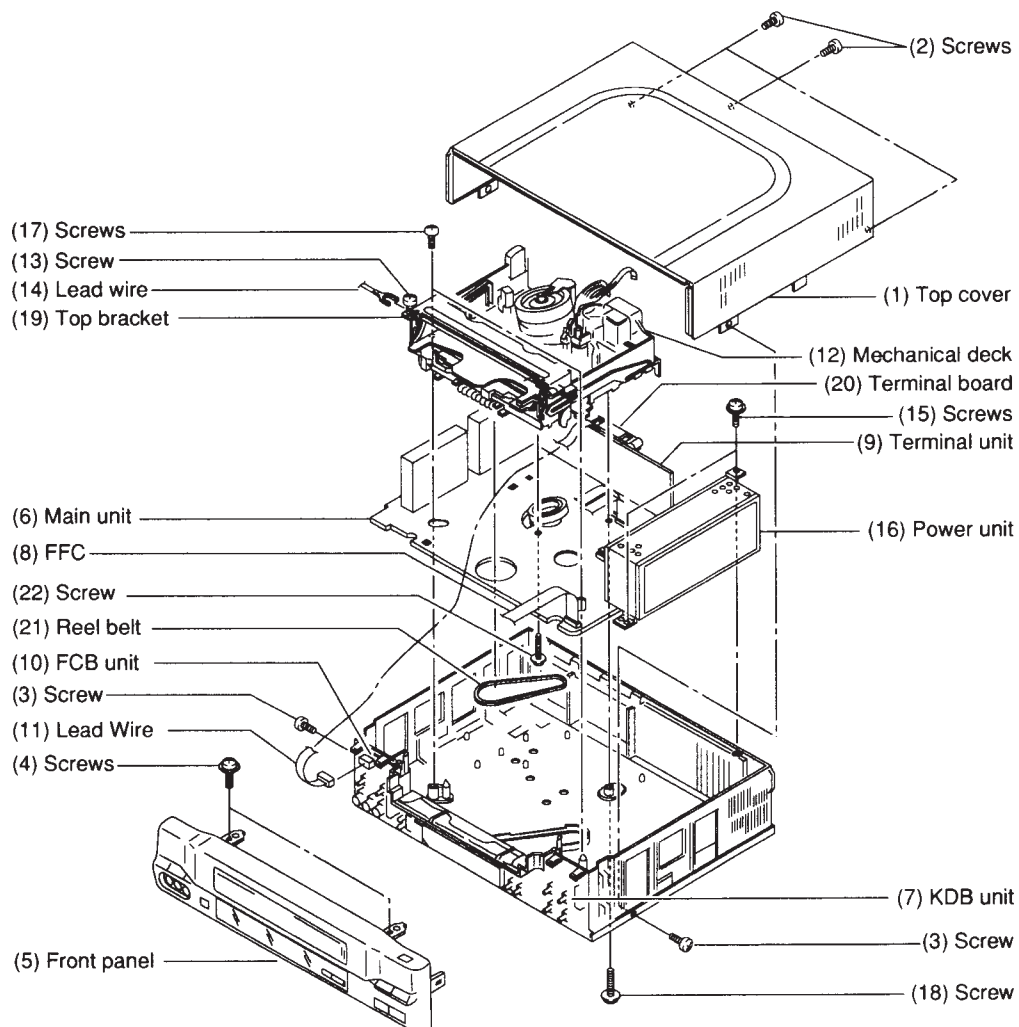


Fig. 5-1-1

### 1-5-2. Mechanical Deck Mounting

1. Turn over the mechanical deck and lower the main unit vertically adjusting the tape end sensor and etc. to the holes.

**Note:**

- Adjust the rotor of the cylinder motor and the stator of the main unit, and then lower the main unit further more till four claws catch the mechanical deck completely.
  - Take care not to damage the rotor and the stator.
  - When locking the claw of the front right side to the main unit, turn the REC inhibit lever so as not to damage the switch.
2. Mount the mechanical deck on the chassis in reverse order of removal.

**Note:**

When mounting the front panel, mount it with its door fully open.

### 1-5-3. Confirmation of Each Operation Mode without Cassette

1. Shut out the light to the start/end sensor.
2. Release the both sides of the lock lever and make a slot-in condition.
3. Turn the reel table manually located on the opposite side of the rotating reel table.
4. In this condition, confirmation of each operation mode can be performed.

**Note:**

When turning the opposite side reel table of the rotating reel table manually in playback, FF/REW mode, and sending no reel pulse, the auto eject or power off function is performed.

## 1-6. Main Parts Replacement

### 1-6-1. Top Bracket Replacement

1. Remove two securing screws (2) on the top bracket (1).
2. Remove the top bracket (1) lifting in the direction shown by the arrow.

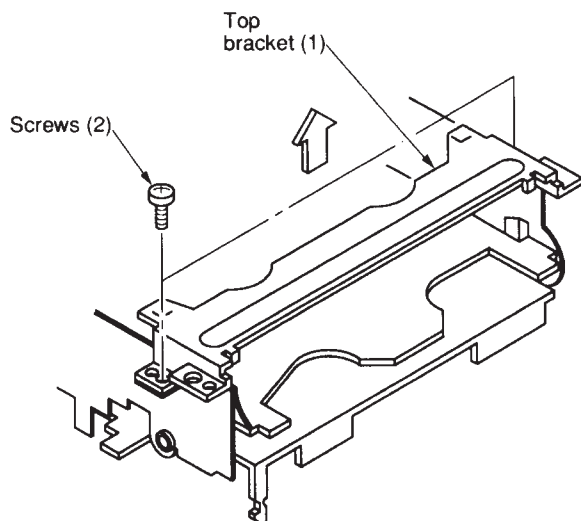


Fig. 6-1-1

3. When mounting the top bracket (1), move the tip of the grip lever (3) on the cassette holder assembly to the inclined portion of a trapezoidal cam, and then mount the top bracket (1).

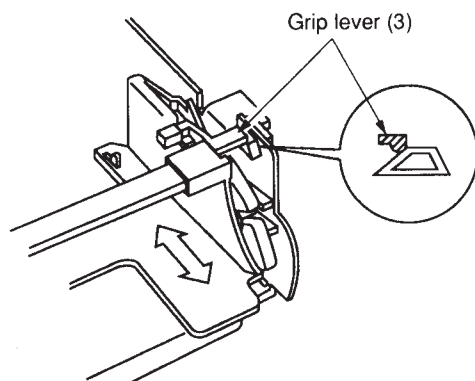


Fig. 6-1-2

#### Note:

- After remounting the top bracket (1), move the cassette holder forward and backward, and then confirm the claws of the lock lever (5) catch completely the both left and right sides of the stopper section (4) at the top bracket (1).

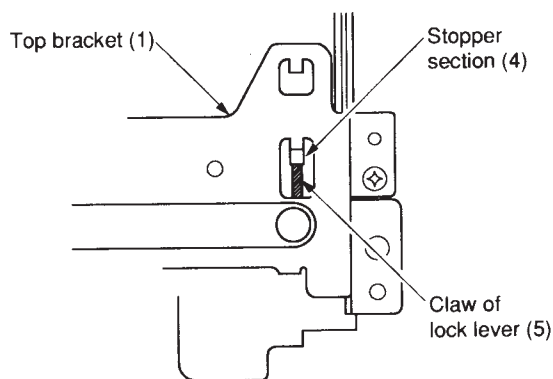


Fig. 6-1-3

### 1-6-2. Cassette Holder Assembly Replacement

1. Remove the top bracket. (Refer to item “1-6-1. Top Bracket Replacement”.)
2. The cassette holder assembly (1) is guided along the guide grooves (2) with both left and right bosses of the cassette holder assembly (1). So first remove each side boss (3) on both left and right sides of cassette holder assembly (1) from the guide groove (2).
3. When the cassette holder assembly (1) is set at the EJECT position, the boss is located at (a), so move the boss from (a) to (b) and remove the bosses on both left and right sides simultaneously.

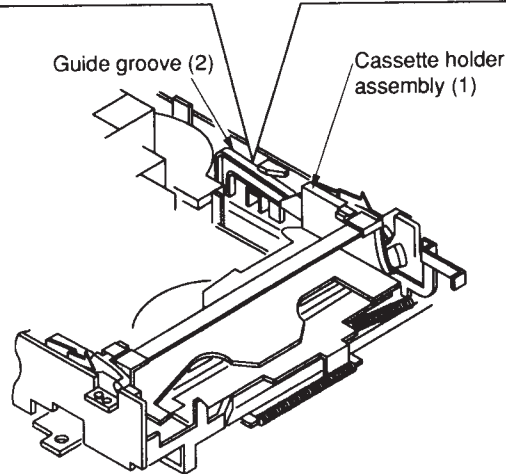
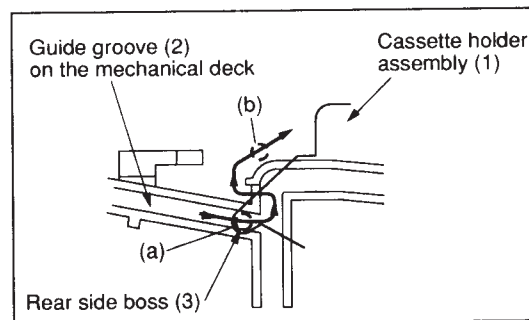
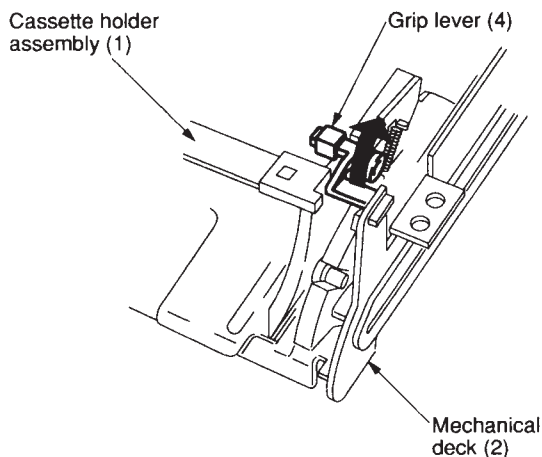


Fig. 6-2-1

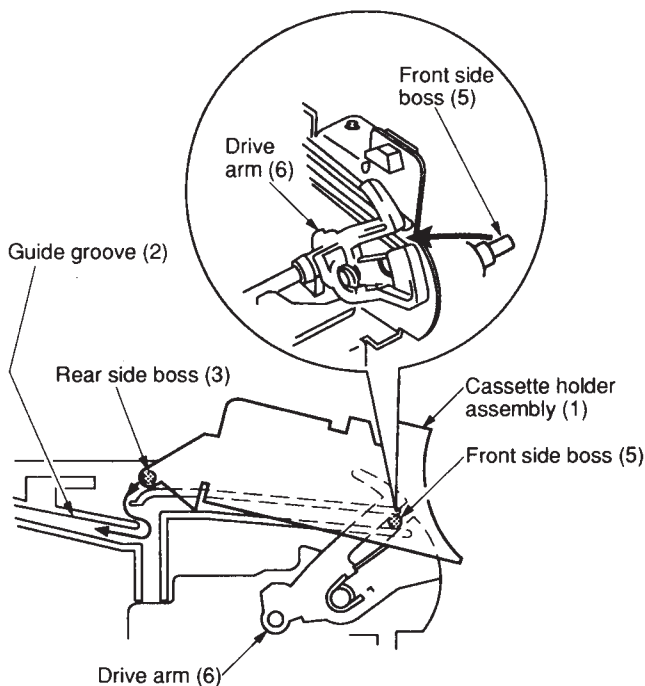


**Note:**

The grip lever (4) on the cassette holder assembly (1) may catch the trapezoidal cam on the mechanical deck (2), so perform the work lifting the grip lever in the direction shown by the arrow.

**Fig. 6-2-2**

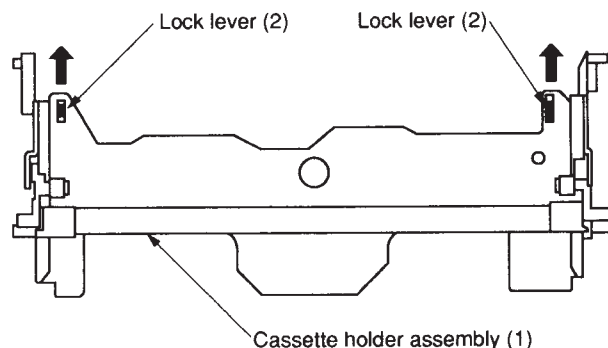
4. After removing the front side bosses (5) on both left and right sides, remove the cassette holder assembly (1) pulling to the front side.
5. When mounting the cassette holder assembly (1), insert the front side bosses (5) to the U shaped groove of the drive arm (6) and the guide groove (2) on the mechanical deck lifting the rear side of the cassette holder assembly (1).

**Fig. 6-2-3**

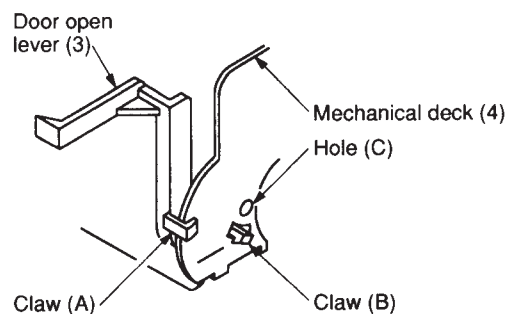
6. When mounting the rear side bosses (3), perform the reverse order of removal.

**1-6-3. Door Open Lever Replacement**

1. Release the lock lever (2) on the cassette holder assembly (1) pressing in the direction shown by the arrow.

**Fig. 6-3-1**

2. Move the cassette holder assembly (1) slightly to the rear side.
3. Remove the claws (A) and (B) on the door open lever (3) from the mechanical deck (4).
4. Match the boss on a new door open lever (3) and the hole (C) on the mechanical deck, and then insert the claws (B) first and then (A) to the mechanical deck (4).

**Fig. 6-3-2**

5. Remount the cassette holder assembly to the position as it was.



#### 1-6-4. Drive Lever Gear Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.

##### Note:

- In this condition, both mark holes on the F/L drive slider (1) and the mechanical deck fit with each other, also the hole of the boss on the drive lever gear (2), the center of the gear tooth and the marking line are in line.
2. Move the claw of the drive arm (3) to the direction of the arrow (A) and remove the drive lever gear (2) upward.

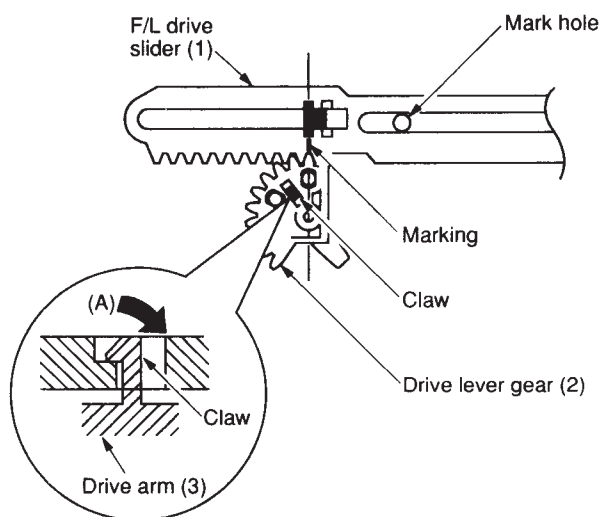


Fig. 6-4-1

3. When remounting the drive lever gear (2), take care of the phase position (refer to the note described above.) and mount in the reverse order of removal.

#### 1-6-5. Drive Arm Assembly Replacement

1. Remove the top bracket assembly. (Refer to item “1-6-1. Top Bracket Replacement”.)
2. Remove the cassette holder assembly. (Refer to item “1-6-2. Cassette Holder Assembly Replacement”.)
3. Remove the door open lever. (Refer to item “1-6-3. Door Open Lever Replacement”.)
4. Remove the drive lever gear. (Refer to item “1-6-4. Drive Lever Gear Replacement”.)
5. Pull the REC-inhibiting lever slightly to the front side, turn the drive arm assembly (1) to the front side and push it in the direction shown by the arrow. Remove the left side boss (2) on the drive arm assembly (1) from the cutout of the guide groove on the mechanical deck (3).
6. Remount the drive arm assembly (1) in the reverse order of removal.

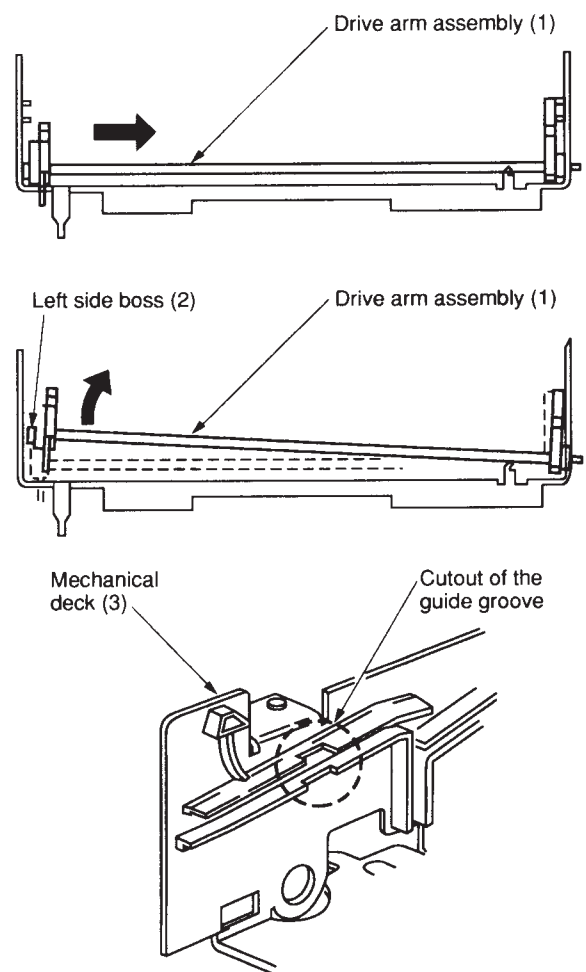


Fig. 6-5-1

### 1-6-6. Cam Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-29. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-40. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-21. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-31. Cam Gear Replacement".)
8. Move the cam lever (1) until it stops in the direction shown by the arrow (A). Pull out the cam lever (1) lifting up straightly at the position where the cam lever (1) stops.
9. Apply grease to the portions of bosses (A) to (C) on a new cam lever.

#### Note:

- Confirm that the boss (A) on the cam lever (1) is inserted into the hole on the F/L drive slider (2).
- After inserting the cam lever (1), confirm that the cam lever (1) moves smoothly.

10. Replace the cam lever in the reverse order of removal.

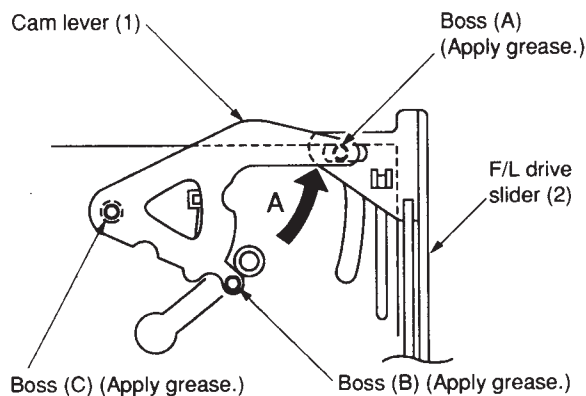


Fig. 6-6-1

### 1-6-7. F/L Drive Slider Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
4. Remove the loading drive assembly. (Refer to item "1-6-29. Loading Drive Assembly Replacement".)
5. Remove the drive lever. (Refer to item "1-6-40. Drive Lever Replacement".)
6. Remove the pinch roller assembly. (Refer to item "1-6-21. Pinch Roller Assembly Replacement".)
7. Remove the cam gear. (Refer to item "1-6-31. Cam Gear Replacement".)
8. Remove the cam lever. (Refer to item "1-6-6. Cam Lever Replacement".)
9. Remove the drive lever gear. (Refer to item "1-6-4. Drive Lever Gear Replacement".)
10. Push the F/L drive slider (1) in the direction shown by the arrow (A) and slide it. Furthermore, pull out it to the front side lifting it in the direction shown by the arrow (B).
11. Apply grease to the shaded parts (a) to (d) on a new F/L drive slider (1).

#### Note:

For the phase alignment of the drive lever gear, refer to item "1-6-4. Drive Lever Gear Replacement".

12. Replace the F/L drive slider (1) in the reverse order of removal.

#### Note:

After completion of the replacement, confirm that the F/L drive slider (1) moves smoothly.

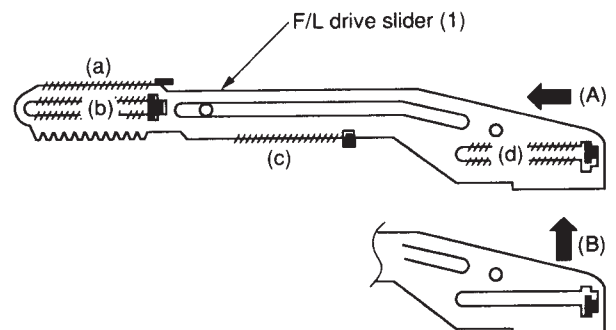


Fig. 6-7-1

### 1-6-8. Arm Brake Lever Assembly and Arm Brake Torsion Spring Replacement

1. Make the cassette holder assembly to the slot-out (EJECT) position.
2. Turn the arm brake lever assembly (1) in the direction shown by the arrow (A) until it stops. Pull out the arm brake lever assembly (1) to the front at the position it stops.

#### Note:

Take care that the arm brake torsion spring (2) is removed forcefully.

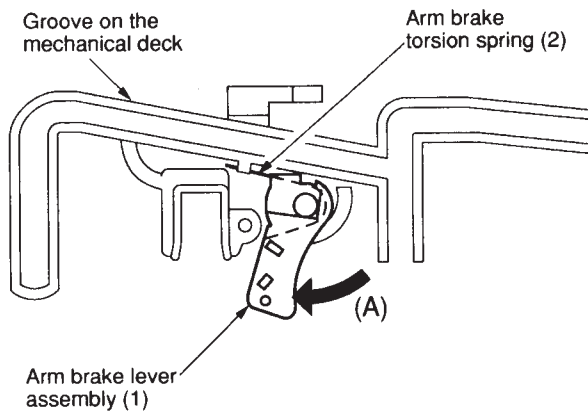


Fig. 6-8-1

3. Hook the arm brake torsion spring (2) temporarily to a new arm brake lever assembly (1).

#### Note:

Take care of the direction of the arm brake torsion spring (2) so that the longer end of the arm brake torsion spring (2) is hooked on the temporary hook.

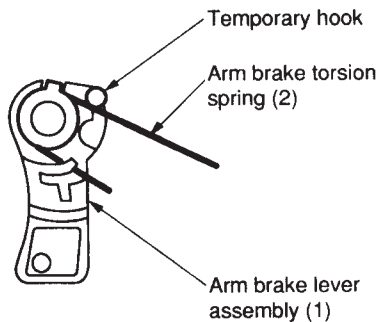


Fig. 6-8-2

4. Insert the hook portion on the arm brake lever assembly (1) to the cutout on the mechanical deck.
5. Turn the arm brake lever assembly (1) counterclockwise and fix it at the position which the arm brake lever assembly (1) faces to the straight below.
6. When pushing the tip of the arm brake torsion spring (2) located at (B) position, the tip is removed from the temporary hook and moves to the hook on the mechanical deck.
7. The arm brake lever assembly turns to the specified position by force of the arm brake torsion spring.

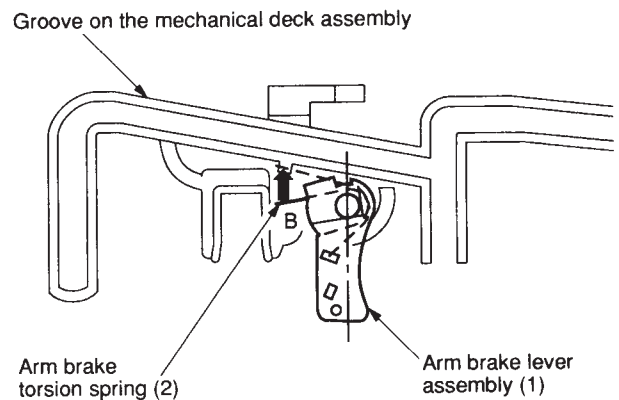


Fig. 6-8-3

## 1-6-9. Cylinder Assembly Inspection and Replacement

### <Inspection>

1. Check if the tape transport surface on the lower cylinder assembly are not damaged.
2. Check if the rotation of the upper cylinder assembly is not abnormal.

When any abnormality is found according to the inspection procedures described above 1 and 2, replace the cylinder assembly.

### <Replacement>

1. Remove the ground brush assembly.
2. Remove the head cleaner. (Refer to item "1-6-14. Head Cleaner Replacement.")
3. Remove the FPC (1) on the Preamplifier.
4. Remove three screws (2) and the cylinder holding plate (3) and (4). (Refer to item "1-6-12. Cylinder Holding Plate Replacement".)
5. Remove the cylinder assembly (5).
6. Remount the cylinder assembly (5) in the reverse order of removal. Fix the cylinder pressing slightly in the direction shown by the arrow (A) and the cylinder holding plate (3) pressing slightly in the direction shown by the arrow (B). (Tightening torque: 294 – 392 mN•m (3 – 4 kg•cm))

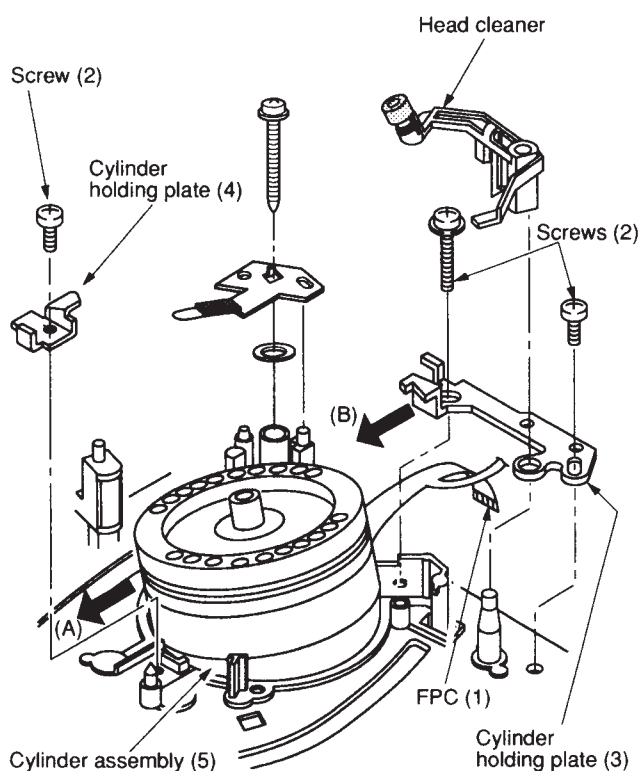


Fig. 6-9-1

### Note:

- When replacing, take much care not to touch the video head directly and damage the cylinder.
7. Perform the tape transport adjustment.

## 1-6-10. Upper Cylinder Assembly Inspection and Replacement

### <Inspection>

1. Check if the video heads are damaged or worn out.
2. Check the video heads for clogging. (In case that the clogging is not remedied after cleaning.)

### <Replacement>

1. Remove the ground brush assembly.
2. Remove two securing screws (1) and remove the upper cylinder assembly (2).
3. Clean the new upper cylinder assembly (2) and the flange (3) mounting surface with a cleaning kit.
4. Align the head (A) (green) and the marker on the rotary transformer PC board (4) and then mount the upper cylinder assembly (Tightening torque : 294 – 392 mN•m. (3 – 4kg•cm))

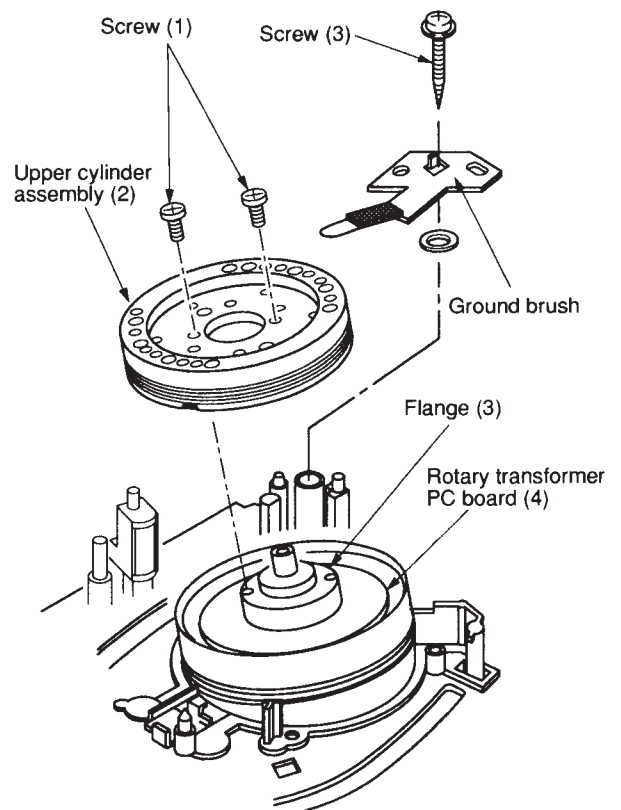
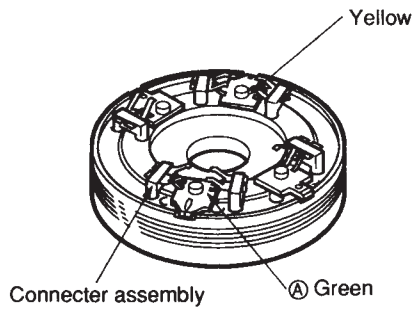
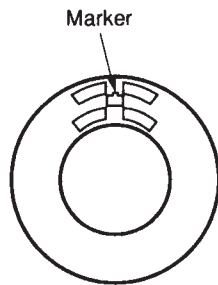


Fig. 6-10-1



**Fig. 6-10-2**



**Fig. 6-10-3**

**Note:**

- During the work in steps 3 to 4, take care not to touch the connector assembly and deform the spring.
5. Perform the tape transport adjustment according to its procedures.

## 1-6-11. Lower Cylinder Assembly Inspection and Replacement

### <Inspection>

1. Check if the tape transport surface on the lower cylinder assembly is not damaged.
2. Check if the rotation of the upper cylinder assembly is not abnormal.
3. Check if the FPC on the Preamplifier is not damaged.

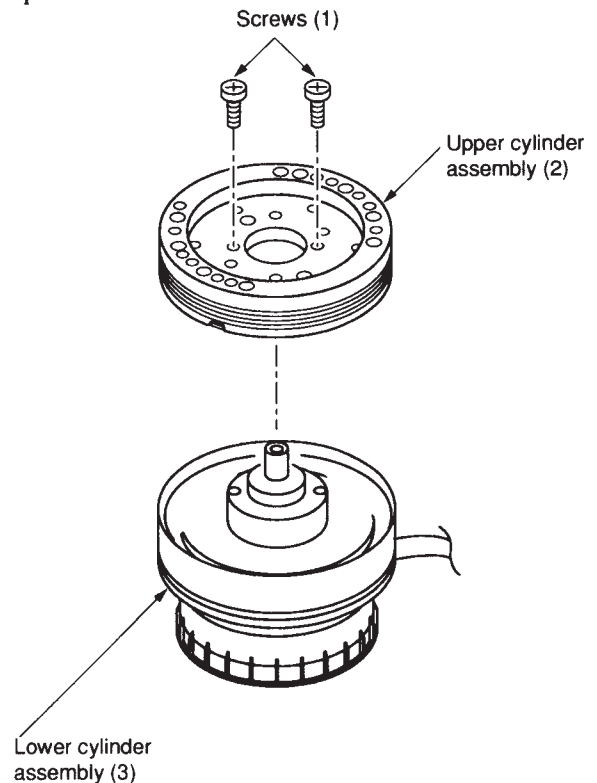
When any abnormality is found under the inspection described in the steps (1) to (3), replace the cylinder assembly.

### <Replacement>

1. Remove the cylinder assembly. (Refer to item “1-6-9. Cylinder Assembly Inspection and Replacement”.)
2. Remove two securing screws (1) and remove the upper cylinder assembly (2).
3. Replace the lower cylinder assembly (3).
4. Mount the lower cylinder assembly in the reverse order of removal taking care not to touch the video head directly and damage the cylinder.

**Note:**

- Take care not to deform the joint spring on the upper cylinder assembly (2).
5. Perform the tape transport adjustment according to its procedures.



**Fig. 6-11-1**

### 1-6-12. Cylinder Holding Plate Replacement

1. Remove screws (1) and (2) securing the cylinder holding plate (3) and a screw (5) securing the cylinder holding plate (4).
2. Remove the cylinder holding plate (3) and (4) sliding in the direction shown by the arrow (B) and (A).
3. Eliminate the cylinder lock key (wedge shaped parts).
4. After replacing the cylinder holding plates (3) and (4), mount new parts in the reverse order of removal.

#### Note:

- When remounting, fix the cylinder while pushing in the direction shown by the arrow (A) and the cylinder holding plate (3) in the direction shown by the arrow (B). Then tighten three screws while pushing the cylinder holding plate (4) toward the stopper on the outsert of the mechanical deck.
- Tightening order of the screws is (1) → (2) → (5).
- Tightening torque of the screws (1), (2), (5) is 294 – 392 mN•m (3 – 4 kg•cm).

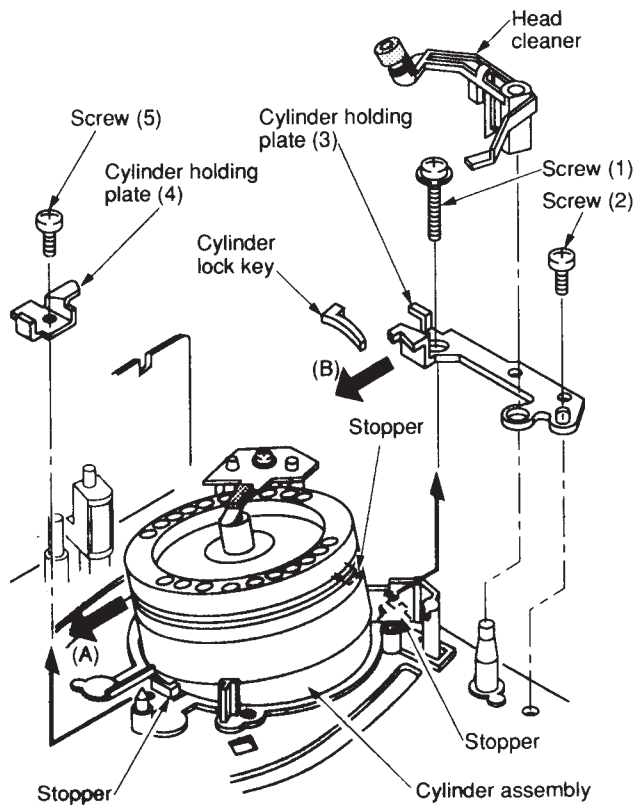


Fig. 6-12-1

### 1-6-14. Head Cleaner Replacement

#### <Roller sub assembly replacement>

1. Remove the roller sub cleaner assembly (2) pulling upward from the hook (A) on the cleaner lever (1).
2. After replacing the roller sub assembly, mount in the reverse order of removal.

#### <Cleaner lever replacement>

1. Undo the hook (B) of the cleaner lever (1) from the mechanical deck, and pull out the cleaner lever (1) upward.
2. Replace the cleaner lever (1) on the roller sub assembly (2), and mount the cleaner lever (1) in the reverse order of removal.

#### Note:

- Take care the roller sub assembly (2) is not stained with grease or oil.

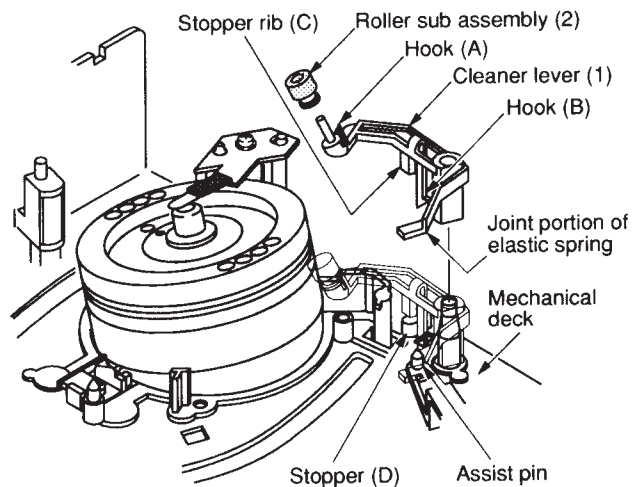


Fig. 6-14-1

#### Note:

- When remounting the head cleaner, position the stopper rib (C) in front of the stopper (D).

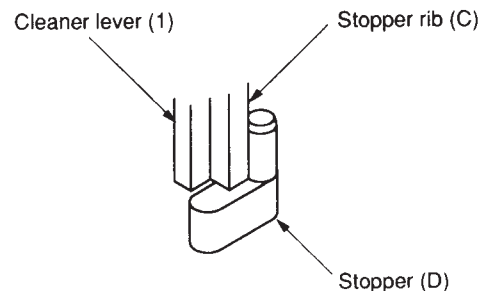
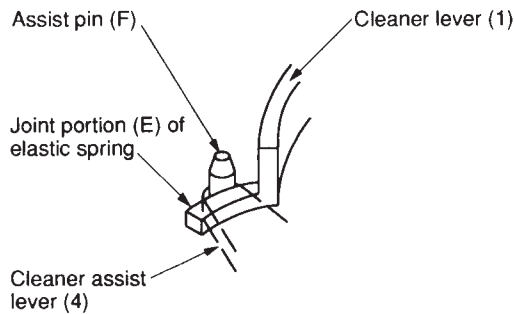


Fig. 6-14-2



**Note:**

- Confirm that the joint portion (E) of the elastic spring positions in front of the assist pin (F) on the cleaner assist lever (4).

**Fig. 6-14-3****1-6-15. No. 8, No. 3 Guide Sleeves Replacement**

1. When replacing the No. 8 guide sleeve (1), first remove the guide cap (2) on the loading bracket assembly.
2. Pull out the guide sleeve (1) from the guide post (3).

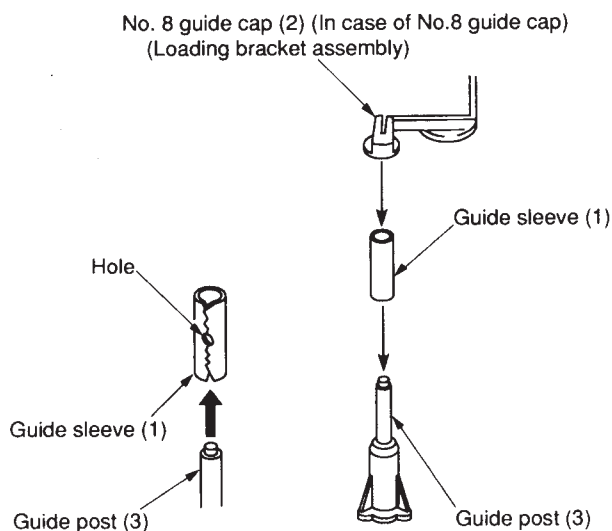
**Note:**

- Take care not to break the No. 8, No. 3 guide posts on the mechanical deck if twisting the guide sleeve forcefully.

3. Insert a new guide sleeve (1) to the guide post.

**Note:**

- When inserting the guide sleeve (1), take care so that its hole faces the opposite side to the tape transport surface.
4. For No. 8 guide sleeve, insert the No. 8 guide cap (2) onto it.

**Fig. 6-15-1****1-6-16. ACE Head Assembly Replacement**

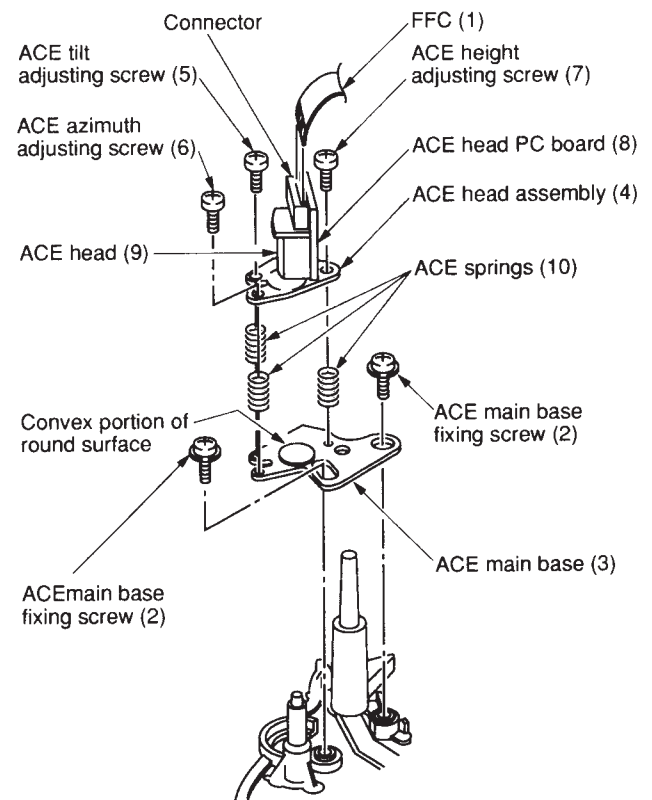
1. Remove the FFC (1) from the connector.
2. Remove two screws (2) and remove the ACE main base (3) and ACE head assembly (4).
3. Remove three adjusting screws (5), (6), and (7) and then remove the ACE head assembly (4).

**Note:**

- When replacing ACE head (9) only without replacing its PC board, unsolder the ACE head (9) on the ACE head PC board (8) and then remove the ACE head (9) and the ACE head PC board (8).
4. Mount the ACE head assembly (4) in the reverse order of removal.

**Note:**

- When reassembling the ACE head assembly (4), First set the ACE springs (10) between the ACE head assembly (4) and the ACE main base (3), and secure the adjusting screws (5), (6), and (7).

**Fig. 6-16-1**



- When securing three adjusting screws, mount the ACE main base (3) and ACE head assembly (4) so that the clearance between them becomes parallel with the specified preset value ( $4.3 \pm 0.1$  mm).
5. After replacing, perform the tape transport adjustment.

**Note:**

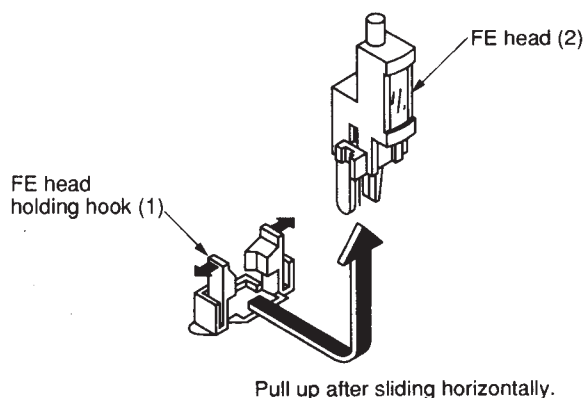
- When replacing the ACE head assembly (4), always use an ACE head (9) having the same part number. Do not use any other ACE head assembly.

### 1-6-17. FE Head Replacement

1. Open the FE head holding hook (1) on the mechanical deck slightly in both left and right directions and remove the FE head (2) by moving in the direction shown by the arrows.
2. Replace the FE head (2) and mount the parts in the reverse order of removal.
3. Perform adjustment from the linearity adjustment item in the tape transport system adjustment.

**Note:**

- When mounting the FE head, Push the head backward completely.
- Though FE head (2) can be removed upward by opening the FE head holding hook (1) to both left and right directions, perform the standard replacement procedure described above since this may cause deformation of the hook.



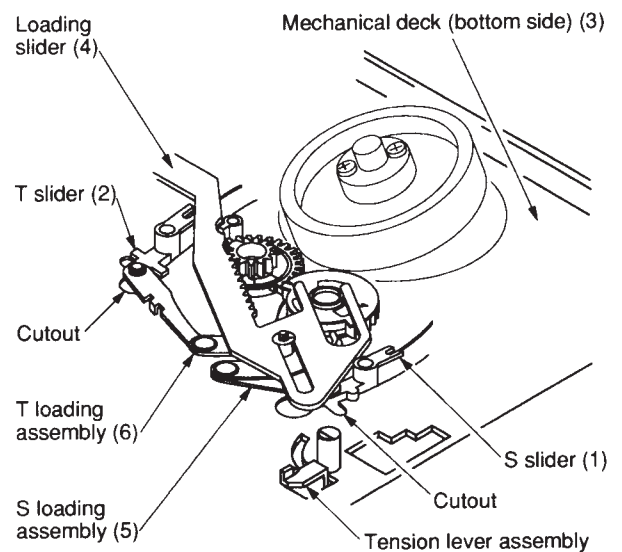
**Fig. 6-17-1**

### 1-6-18. S, T Slider Replacement

1. Remove the tension lever assembly. (Refer to item “1-6-23. Tension Lever Assembly Replacement”.)
2. Remove the loading slider. (Refer to item “1-6-25. Loading Slider Replacement”.)
3. Remove the S loading assembly. (Refer to item “1-6-24. S Loading Assembly Replacement”.)
4. Remove the T loading assembly. (Refer to item “1-6-24. T Loading Assembly Replacement”.)
5. Remove the S slider (1) and T slider (2) lifting up to the cutout of the groove on the mechanical deck (3).
6. Remove the S and T guide rollers and mount a new slider.
7. Mount the parts in the reverse order of removal.

**Note:**

Perform the phase alignment between the loading slider (4) and S, T loading assemblies (5), (6) referring each replacement procedure.



**Fig. 6-18-1**

8. After completion of the replacement, perform the adjustment from item 1 in the tape transport system adjustment.

### 1-6-19. S, T Guide Rollers Replacement

The same replacement procedures will be applied for the S, T guide rollers.

1. Turn the guide roller (1) counterclockwise and remove the guide roller (1) from the slider assembly (2).
2. Mount a new guide roller on the slider assembly (2) turning clockwise.
3. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment..

#### Note:

- O ring is not applied to the T guide roller.
- For the T guide roller, marking is located on the upper flange. So take care not to mis-mount with the S guide roller.

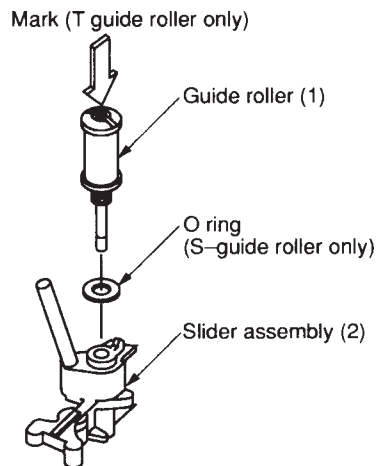


Fig. 6-19-1

### 1-6-20. S, T Impedance Roller Replacement

1. Remove two screws (1) and (2), and then remove two brackets (3), (4).
2. Replace two impedance rollers (5), (6).
3. Mount the parts in the reverse order of removal.
4. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

#### Note:

- S, T impedance rollers (5), (6) is not always applied to all models.

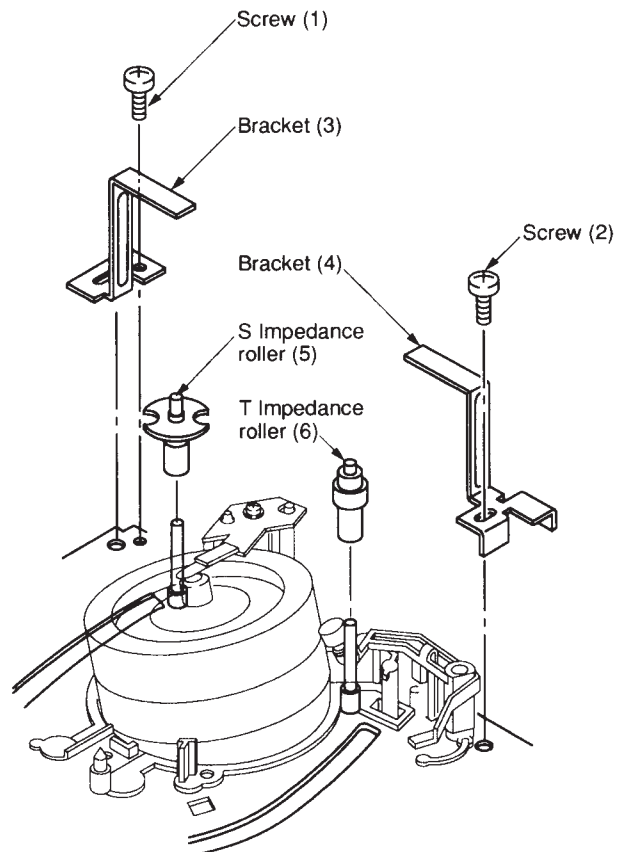


Fig. 6-20-1

### 1-6-21. Pinch Roller Assembly Replacement

1. Remove the loading drive assembly (Refer to item "1-6-29. Loading Drive Assembly Replacement".)
2. Remove the pinch assembly (1) lifting vertically from the pinch post (2).
3. Remove the pinch spring (5) from the hooks on the pinch drive assembly (3) and the pinch lever assembly (4).
4. Turn the projection (A) on the pinch drive assembly (3) counterclockwise till it goes to the cutout on the pinch lever assembly (4).
5. After replacing, mount the parts in the reverse order of removal.
6. After completion of the replacement, perform the tape transport adjustment.

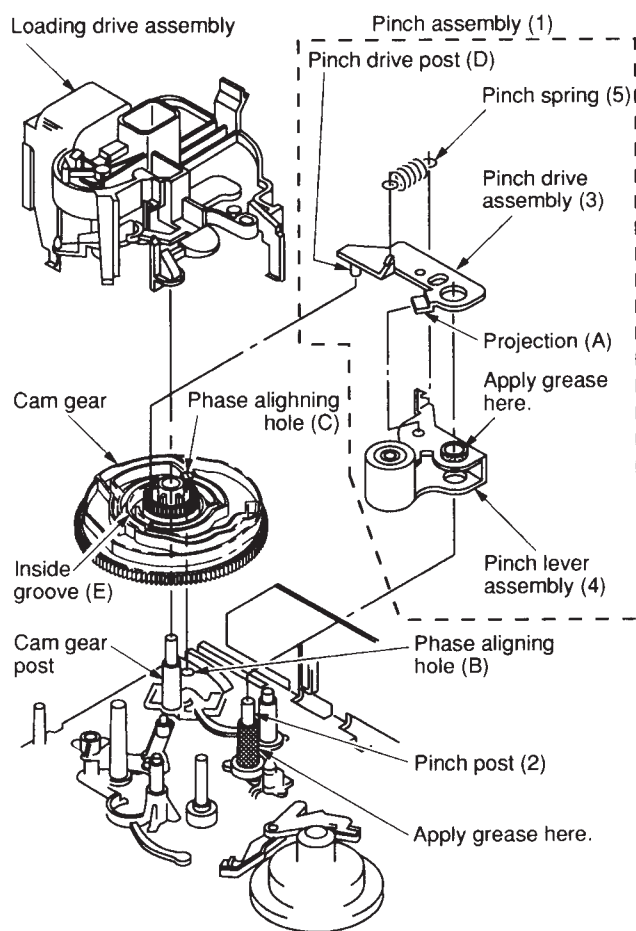


Fig. 6-21-1

**Note:**

- For the removal and assembling of the loading drive assembly, refer to item 1-6-29.
- When inserting the pinch assembly (1) into the pinch post (2), insert it so that the pinch drive post (D) enters the groove (E) inside the cam gear.
- Take care not to touch the surface of the pinch roller and the grease is not stained on it.
- Be sure to apply grease to the surface of the bar-ring on the pinch lever assembly (4) and the pinch post (2) on the mechanical deck.

**1-6-22. No. 9 Guide Lever Assembly Replacement**

1. Remove the loading drive assembly. (Refer to item “1-6-29. Loading Drive Assembly Replacement”.)
2. Remove the drive lever. (Refer to item “1-6-40. Drive Lever Replacement”.)

3. Remove the pinch assembly. (Refer to item “1-6-21. Pinch Roller Assembly Replacement”.)
4. Remove the ACE head assembly. (Refer to item “1-6-16. ACE Head Assembly Replacement”.)
5. Remove the cam gear (2) from the cam gear post (1).
6. Remove the T soft brake spring (3).
7. Remove the No. 9 guide lever assembly (4) lifting the No. 9 guide lever assembly upward from the No. 9 guide post (5).
8. After replacing, mount the parts in the reverse order of removal.
9. After completion of the replacement, perform the tape transport adjustment.

**Note:**

- When mounting the No. 9 guide lever assembly (4), confirm that (A) side of the No. 9 guide lever assembly (4) touches the capstan motor housing portion.
- After inserting the No. 9 guide lever assembly (4) into the No. 9 guide post (5), confirm that the lower projection of the No. 9 guide lever assembly (4) touches to the upper surface of the mechanical deck.
- Take care that the grease is not stained on the No. 9 guide post of the No. 9 guide lever assembly (4).
- Be sure to apply grease to the No. 9 guide post (5).

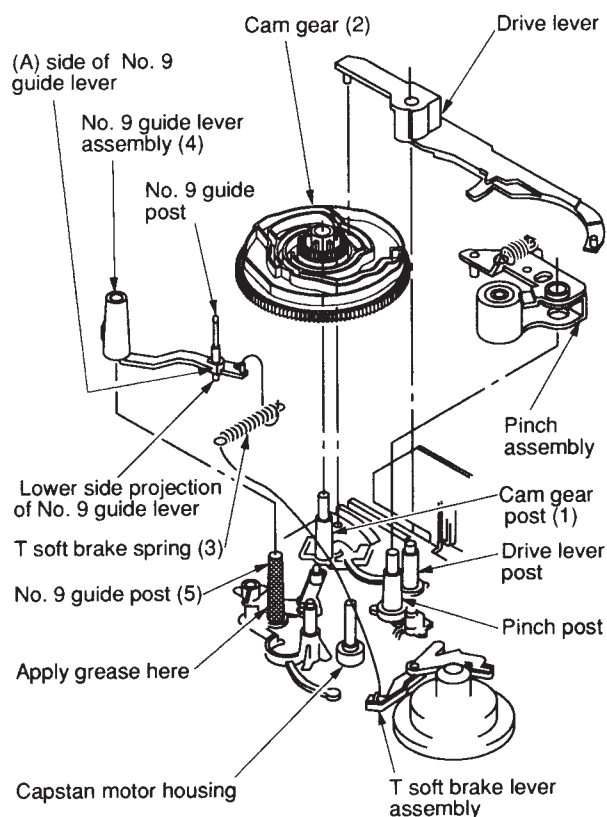


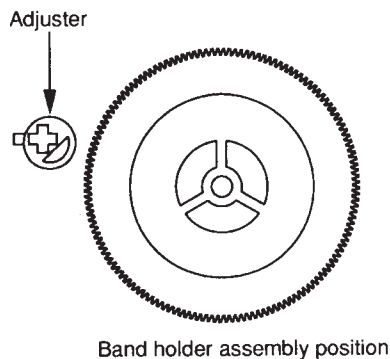
Fig. 6-22-1

### 1-6-23. Tension Lever Assembly, Band Holder and Band Brake Replacement

1. Remove the tension spring (1).

#### Note:

- Take care not to extend or deform the tension spring.
2. After setting the band brake adjuster to the band holder assembling position, undo the claw of the snap-fit type and remove the band holder from the band brake adjuster by lifting it upward.



**Fig. 6-23-1 Detail of band holder assembling**

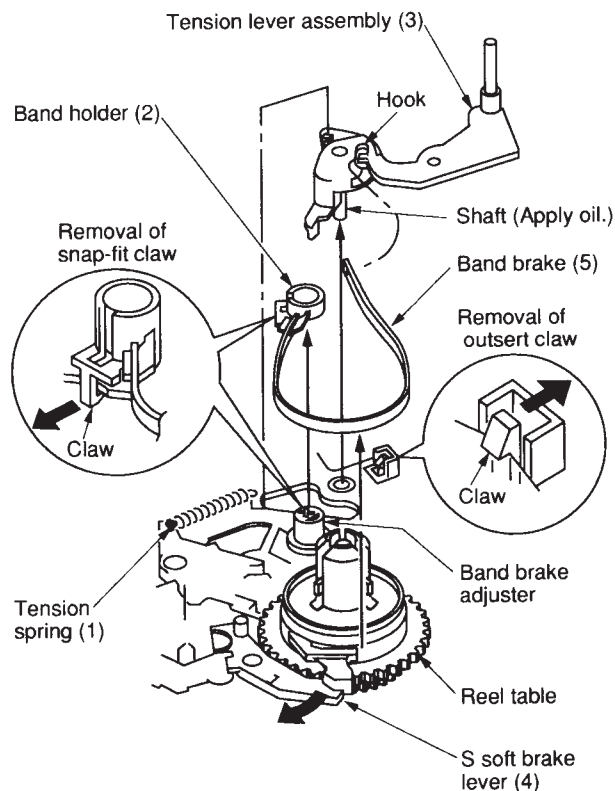
3. Undo the claw of the outsert on the mechanical deck catching the shaft of the tension lever assembly (3) and remove the tension lever assembly lifting it upward.
4. Remove the band brake (5) from the reel table while pulling the S soft brake lever (4) in the direction shown by the arrow.
5. Remove the band brake (5) from the hook on the tension lever assembly (3).

#### Note:

- Take care not to contaminate, bend or damage the felt surface on the band brake (5).
6. After replacing the tension lever assembly (3), clean the shaft on the tension lever and apply a few amount of oil.
  7. Mount the parts in the reverse order of the removal.
  8. After mounting, check the tension post position and perform the adjustment and back tension check.
  9. After completion of the replacement, perform the adjustment from the linearity adjustment in the tape transport system adjustment.

#### Note:

- The band holder (2) can be replaced in the procedures described above steps 1 to 3.
- The band brake (5) can be replaced in the procedures described above steps 1 to 5.
- When replacing the band holder (2) and band brake (5), the linearity adjustment is not necessary.



**Fig. 6-23-2**

### 1-6-24. S,T Loading Assembly Replacement

1. Remove the mechanical deck assembly from the main PC board.
2. Set the mechanical position to the F/L out position (front side). Turn over the mechanical deck.
3. Remove the loading slider assembly. (Refer to item "1-6-25. Loading Slider Assembly Replacement".)

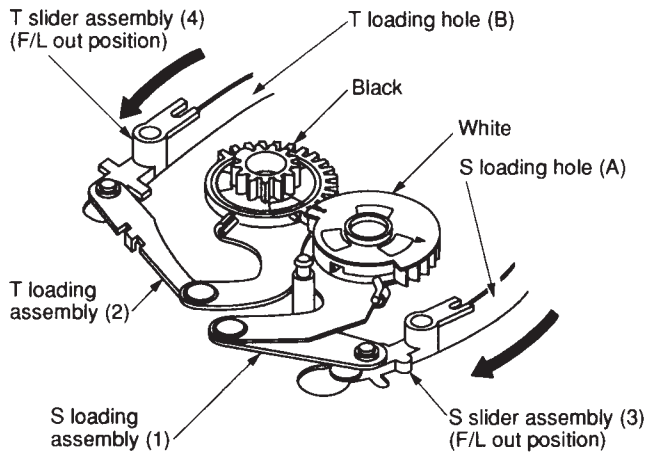


Fig. 6-24-1

4. Remove the S, T loading assemblies (1), (2).
5. Insert the S, T slider assemblies (3), (4) along the cutout of the S, T loading holes (A) and (B) on the mechanical deck and set the S, T slider assemblies (3), (4) to the loading position (rear side).
6. Insert the T loading assembly (2) to the post (C) on the T slider assembly (4) and the post (D) on the mechanical deck. And insert the S loading assembly (1) to the post (E) on the S slider assembly (3) and the post (F) on the mechanical deck.

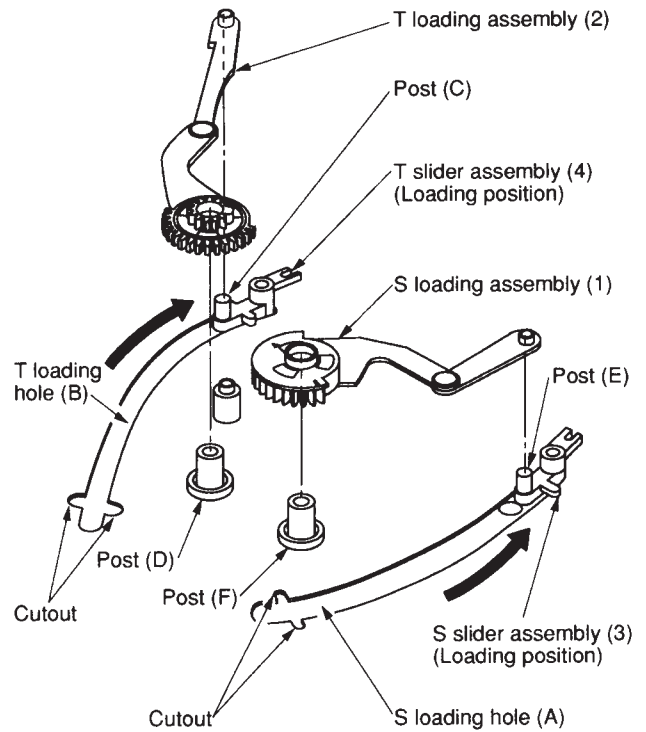


Fig. 6-24-2

#### Note:

- Align the phases of the ▲ marks on the S, T loading gear (1), (2).
7. Set the S, T slider assemblies (3), (4) to the F/L out position.

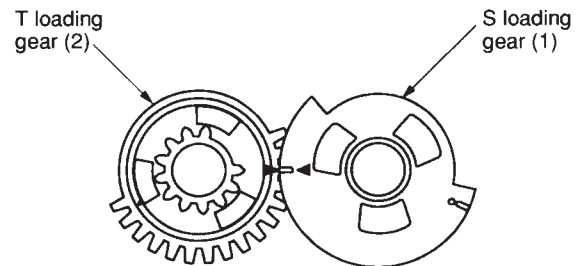


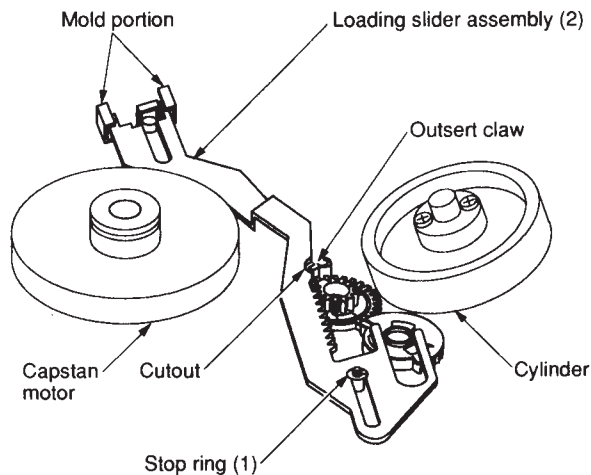
Fig. 6-24-3

### 1-6-25. Loading Slider Assembly Replacement

1. Remove the mechanical deck from the main PC board.
2. Set the mechanical position to the F/L out position.
3. Turn over the mechanical deck.
4. Remove the stop ring (1).
5. Remove the loading slider assembly (2) while lifting its tip upward using the mold portion on the loading slider assembly (2) as a fulcrum.
6. Mount the parts in the reverse order of removal.

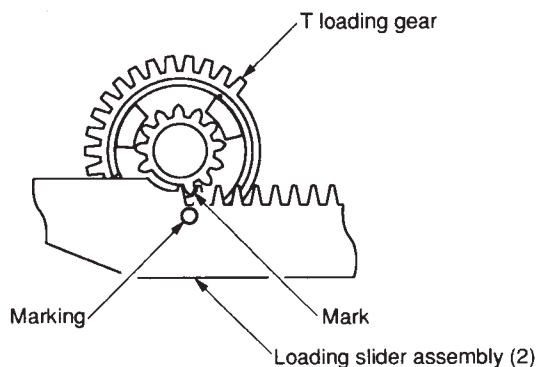
#### Note:

- When mounting the loading slider assembly (2), insert the tip of the loading slider assembly (2) slightly to the mold portion, then mount it so that the claw on the outsert is in the position of the cutout portion of the loading slider assembly.
- Confirm that the position mark on the loading slider assembly (2) and the mark on the T loading gear match each other in position.



**Mechanism deck bottom side**

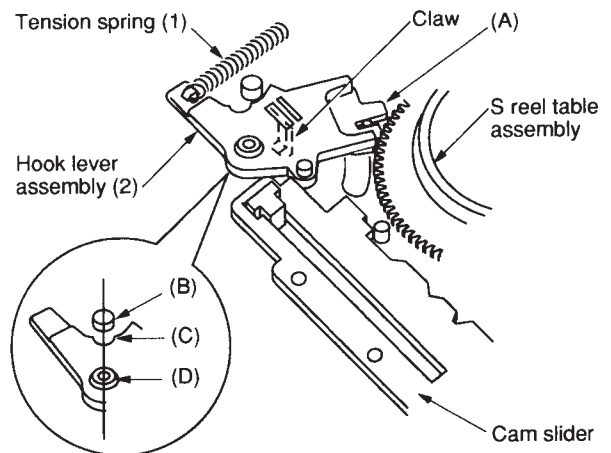
**Fig. 6-25-1 View from Mechanical deck bottom side**



**Fig. 6-25-2**

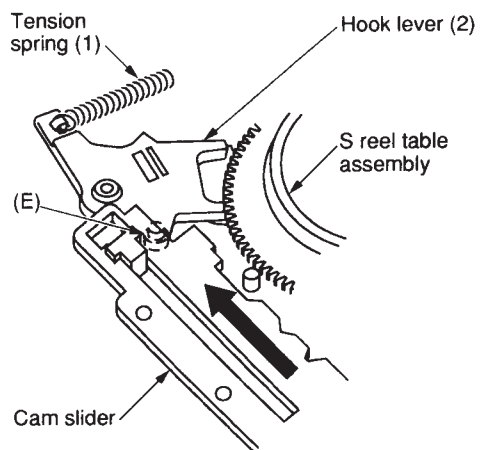
### 1-6-26. Hook Lever Assembly Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the tension spring (1).
5. Turn the hook lever assembly (2) counterclockwise slightly, and remove the claw on the hook lever assembly (2) then replace.
6. After replacing the hook lever assembly (2), insert the (A) portion of the hook lever under the S reel table assembly. When the portions (B), (C), (D) are in line, push the claw into the mechanical deck.



**Fig. 6-26-1**

7. Turn the hook lever assembly (2) clockwise till it stops, and mount the tension spring (1). After replacing the hook lever assembly (2), slide the cam slider in the direction shown by the arrow, and then position the boss (E) under the cam slider.



**Fig. 6-26-2**



### 1-6-27. Hook Replacement

1. Remove the hook lever assembly. (Refer to item “1-6-26. Hook Lever Assembly Replacement”.)
2. Turn over the hook lever assembly (1) and remove the hook lever assembly (1) opening the portion (A) of the hook (2) slightly and lifting the hook (2) upward.
3. When mounting a new hook, push the hook (2) in the portion (B) from above.

#### Note:

- Take care not to confuse the mounting direction of the hook (2).

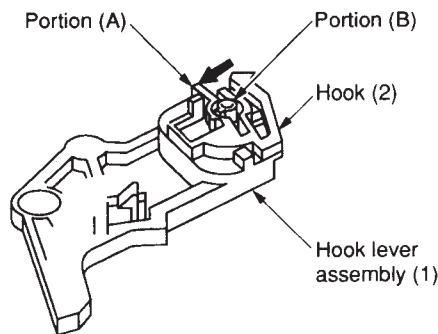


Fig. 6-27-1

### 1-6-28. Tension Drive Lever Replacement

1. Remove the cam slider. (Refer to item “1-6-41. Cam Slider Replacement”.)
2. Turn over the mechanical deck and remove the tension drive lever (1) from the projection (A) moving counterclockwise slightly.
3. After replacing the tension drive lever (1), mount in the reverse order of removal.

#### Note:

- For the cam slider mounting, refer to the notes in item 1-6-41.

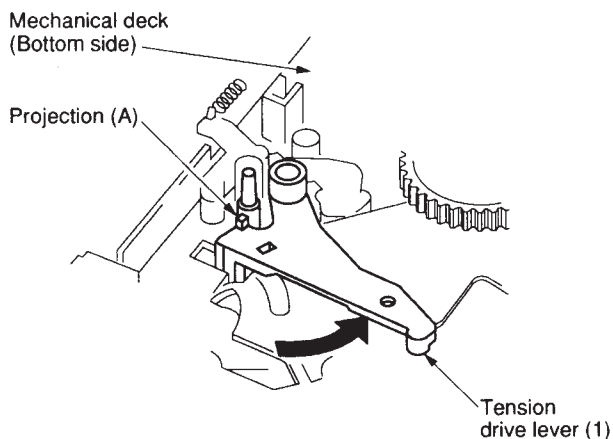


Fig. 6-28-1

### 1-6-29. Loading Drive Assembly Replacement

1. Remove the F/L ground plate and the head cleaner assembly. (Refer to item “1-6-14. Head Cleaner Assembly Replacement”.)
2. Remove two flat cables (1) from the connectors.
3. Pull out the portion (A) (No. 8 guide cap) from the motor bracket (2).
4. Remove four claws (a), (b), (c), (d) securing the motor bracket in the order of (a) → (b) → (c) → (d).

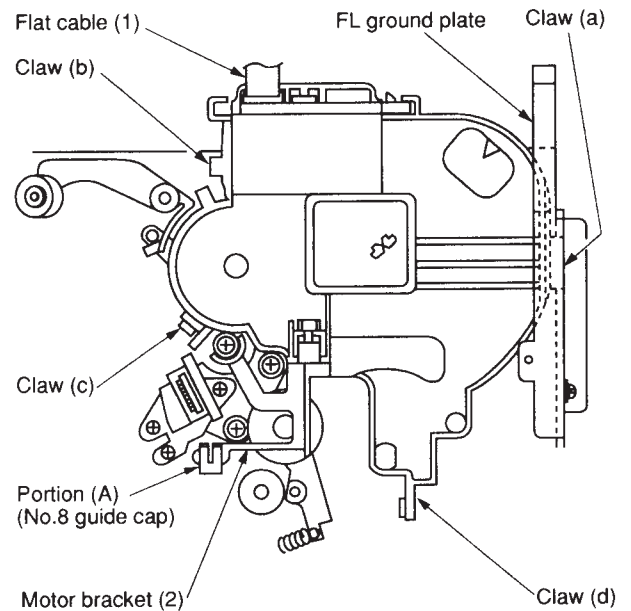


Fig. 6-29-1

#### Note:

- Remove the claw (a) inserting a driver.
- Remove the claws (b) and (c) pushing inside previously and opening the claws slightly.

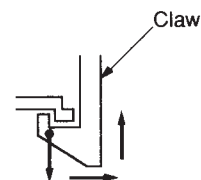
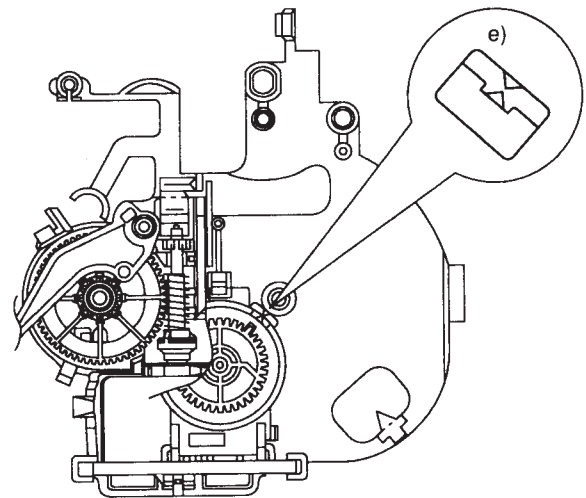
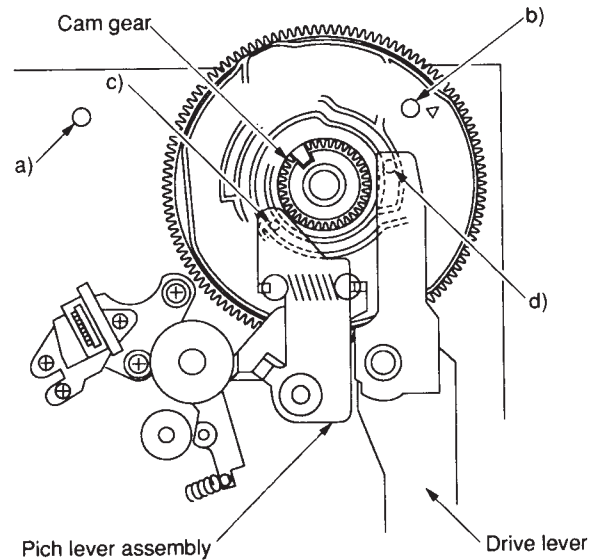


Fig. 6-29-2



**<Preparation for Loading drive assembly mounting >**

- a) Confirm that the head cleaner assembly is removed.
  - b) Confirm that the small hole b) on the cam gear aligns with the hole on the mechanical deck.
  - c) Confirm that the clearance between the pinch lever assembly and the cam gear is approx. 0.3 mm. (Confirm that the pinch lever assembly is correctly mounted on the groove of the cam gear.)
  - d) Confirm that the clearance between the drive lever and the cam gear is approx. 2 mm. (Confirm that the drive lever is correctly mounted on the groove of the cam gear.)
  - e) Confirm that the  $\Delta$  mark on the rotor of the cam switch aligns with the  $\Delta$  mark on the motor bracket.
5. After completion above steps a) to e), mount the loading drive assembly. Push four claws to the motor bracket in the order of (d)  $\rightarrow$  (c)  $\rightarrow$  (b)  $\rightarrow$  (a) and push the portion (A) (No. 8 guide cap) into the motor bracket.
  6. Confirm that the  $\Delta$  mark on the rotor of the cam switch aligns with that on the bracket when the hole b) on the cam gear aligns with the hole on the mechanical deck. If the alignment of the  $\Delta$  marks cannot be confirmed, remove loading drive assembly once again and reinstall after confirming the above steps a) to e).
  7. Mount two flat cables.
  8. Mount the F/L ground plate and the head cleaner assembly.

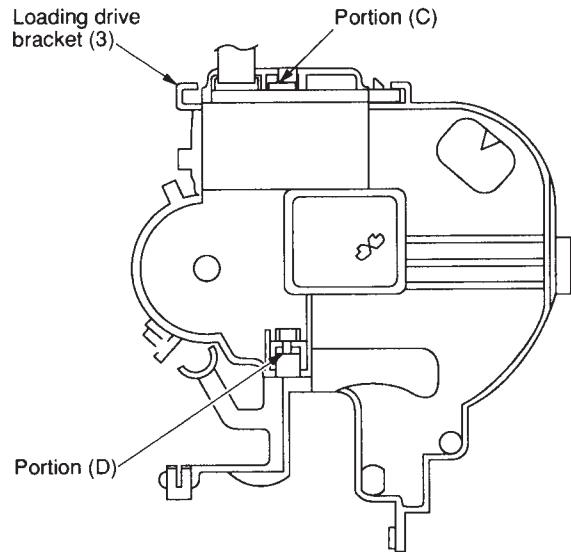


**Loading drive assembly bottom side**

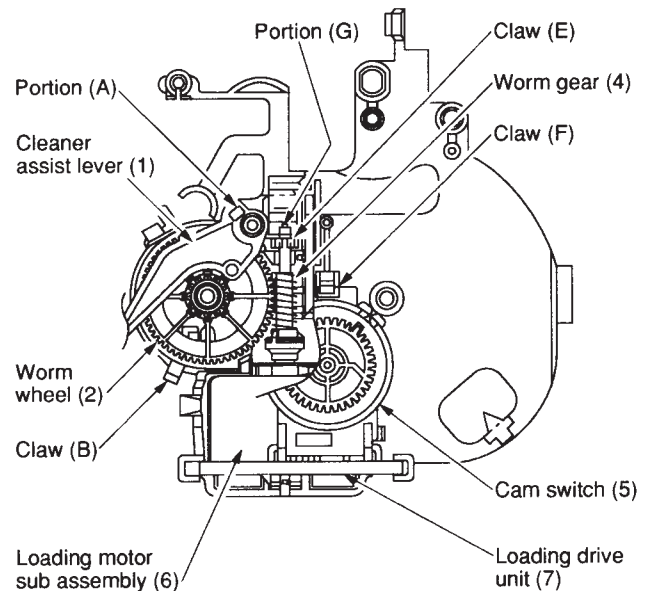
**Fig. 6-29-3**

### 1-6-30. Loading Motor Sub Assembly, Cam Switch and Loading Drive Unit Replacement

1. Remove the loading drive assembly. (Refer to item “1-6-29. Loading Drive Assembly Replacement”.)
2. Remove the cleaner assist lever (1) from the claw (A).
3. After removing the cleaner assist lever (1), the worm wheel can be also removed upward.
4. Insert a slot-type screwdriver into the portion (C) of the loading drive bracket (3) and push the loading motor 2 – 3 mm lower. And push the tip of worm gear from the portion (D) of the loading bracket (3), then remove the worm gear (4) from the claw (E).
5. Remove the cam switch (5) from the claw (F) on the loading drive bracket (3) and pull out the loading drive unit (7) and the worm gear (4) simultaneously.
6. Replace the loading drive unit (7). When mounting the PC boards of the cam switch (5) and the loading drive unit (7), take care that no clearance is allowed.
7. Insert the loading drive unit (7) and the worm gear (4) into the loading drive bracket (3).
8. Push the tip (G) of the worm gear (4) into the claw (E) on the loading motor bracket.
9. Push the cam switch (5) into the claw (F) on the loading motor bracket.
10. Mount the parts in the reverse order of removal.



**Loading drive assembly (Top Side)**



**Loading drive assembly (Bottom side)**

**Fig. 6-30-1**

### 1-6-31. Cam Gear Replacement

1. Remove the loading drive assembly. (Refer to item “1-6-29. Loading Drive Assembly Replacement”.)
2. Remove the cam slider. (Refer to item “1-6-41. Cam Slider Replacement”.)
3. Remove the drive lever. (Refer to item “1-6-40. Drive Lever Replacement”.)
4. Remove the pinch roller assembly. (Refer to item “1-6-21. Pinch Assembly Replacement”.)
5. Remove the cam gear.
6. Apply grease on a new cam gear on the shaded portion as shown in Fig. 6-31-1 and the shaft of the main base.

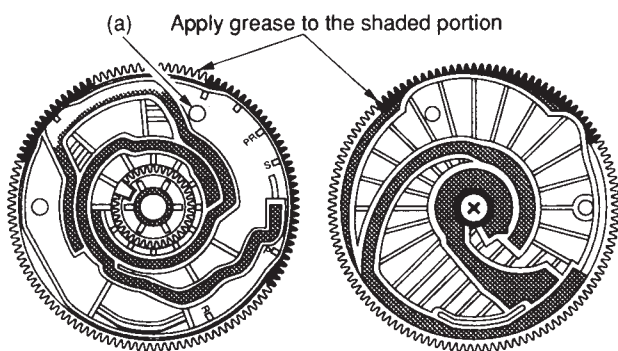


Fig. 6-31-1

7. Make the S, T slider to the slot out condition.
8. Push the cam lever (1) and the pin (2) (loading slider) in the direction shown by the arrows (A) and (B).
9. Mount the cam gear at the angle which the small hole (a) on the cam gear aligns with the hole on the mechanical deck. (Refer to Fig. 6-31-1.)

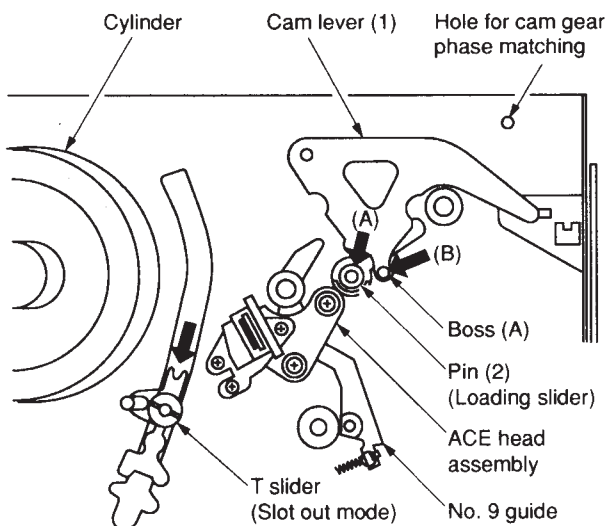


Fig. 6-31-2

10. Mount the parts in the reverse order of removal.

### 1-6-32. S Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item “1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement”.)
2. Remove the drive arm assembly. (Refer to item “1-6-5. Drive Arm Assembly Replacement”.)
3. Remove the cam slider. (Refer to item “1-6-41. Cam Slider Replacement”.)
4. Remove the S soft brake and S main brake assembly. (Refer to item “1-6-38. S Soft Brake Replacement and 1-6-37. S Main Brake Assembly Replacement”.)
5. Remove the tension lever assembly. (Refer to item “1-6-23. Tension Lever Assembly Replacement”.)
6. Remove the S reel table assembly (1) pulling it out upward.
7. Remove the washer 2 (2).
8. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
9. After replacing, mount the parts in the reverse order of removal.
10. Confirm the reel torque using a torque cassette.

#### Note:

- The washer 2 (2) can use repeatedly.

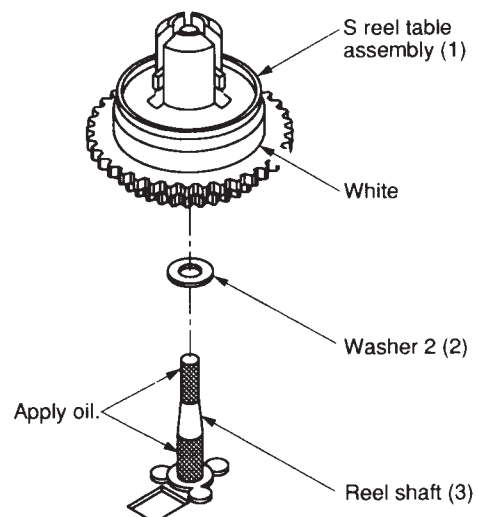


Fig. 6-32-1

### 1-6-33. T Reel Table Assembly and Washer 2 Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the T soft brake and T main brake assembly (Refer to item "1-6-41. Cam Slider Replacement".)
4. Remove the T reel table assembly (1) pulling it out upward.
5. Remove the washer 2 (2).
6. After cleaning the reel shaft (3) with a cleaning kit, insert a new washer 2 (2) to the reel shaft (3) and apply a drop of oil to the shaded portions (two locations) on the reel shaft (3).
7. After replacing, mount the parts in the reverse order of removal.
8. Confirm the reel torque using a torque cassette.

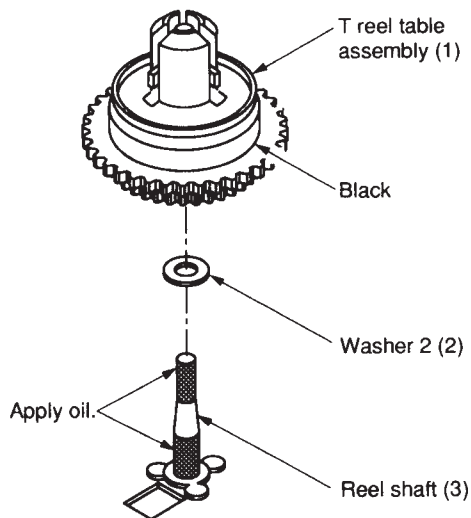


Fig. 6-33-1

#### Note:

- Washer 2 (2) can use repeatedly.

### 1-6-34. Idle Arm Assembly Replacement (Center Gear Pulley, Idle Kick Lever, Idle up/down Lever)

1. Remove the mechanical deck from the main PC board.
2. Remove the stop ring (1) turning over the mechanical deck.
3. Remove the center gear pulley (2) lifting it upward.
4. Remove the claw (A) on the idle kick lever (3) moving and pulling it upward.
5. Remove the slit washer (4).
6. Remove the idle up/down lever (5) and the idle arm (6) simultaneously from two claws (B) on the mechanical deck.
7. After cleaning the center gear post (7) using a cleaning kit, apply a few drops of oil to the shaded portion on the center gear post.
8. Mount the parts in the reverse order of removal.

#### Note:

- Stop ring (1) is impossible to use again.
- When mounting the parts, take care of the notice shown in Fig. 6-34-2.

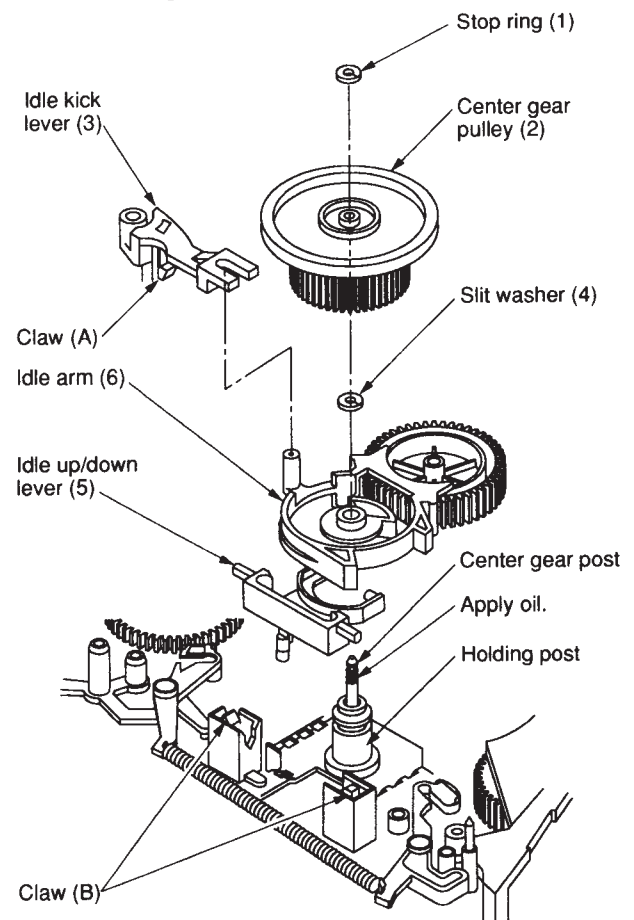


Fig. 6-34-1

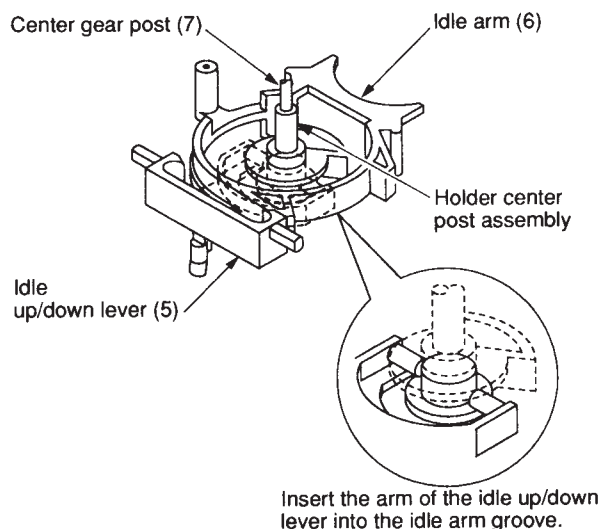


Fig. 6-34-2

### 1-6-35. Holder Center Post Assembly Replacement

1. Turn over the mechanical deck and remove the center gear pulley and the idle arm. (Refer to item "1-6-34. Idle Arm Assembly Replacement".)
2. Turn over the mechanical deck and remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Assembly Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. After removing two screws (1), replace the holder center post assembly (2).
5. After replacing, mount the parts in the reverse order of removal.

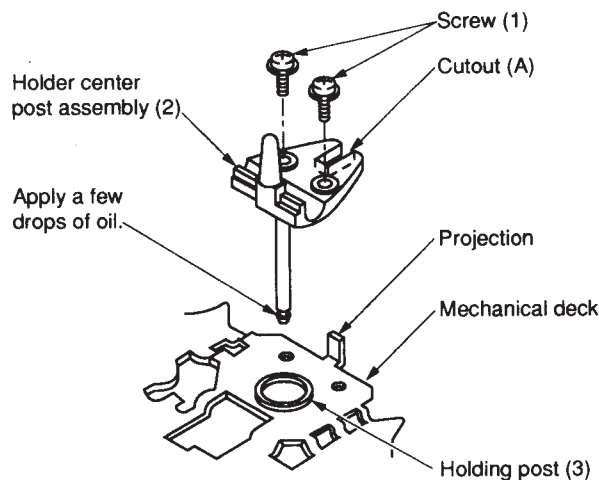


Fig. 6-35-1

### Note:

- When mounting, push the cutout (A) on the holder center post assembly (2) aligning with the projection on the mechanical deck.
- Screw tightening torque is 294 – 392 mN•m (3 – 4 kg•cm).
- Before mounting the center gear pulley, apply a few drops of oil. (Refer to Fig. 6-34-1.)

### 1-6-36. REC Inhibiting Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
4. Remove the tension spring (2).
5. Undo the claw (A) on the S soft brake (1) sliding and lifting it upward.
6. Remove the projection (B) on the REC inhibiting lever (3) sliding in the direction shown by the arrow and lifting it upward.
7. After replacing the REC inhibiting lever (3), mount the parts in the reverse order of removal.

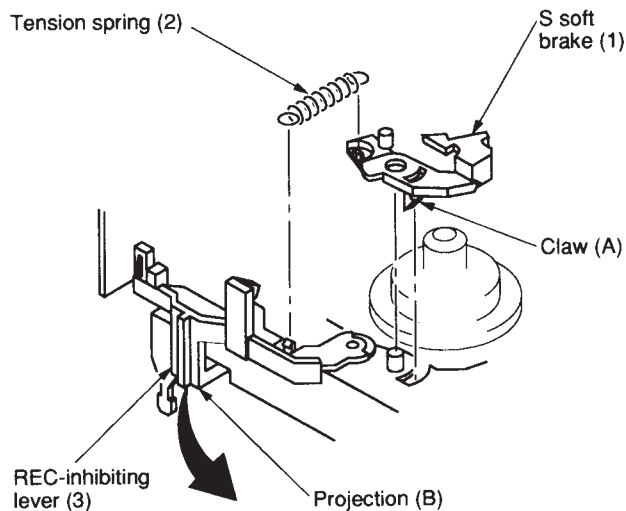


Fig. 6-36-1

### 1-6-37. S, T Main Brake Assembly Replacement

1. Remove the mechanical deck from the main PC board and turn the mechanical deck upside down.
2. When replacing the T main brake assembly (2), first remove the idle kick lever (3). (Refer to item "1-6-34. Idle Arm Assembly Replacement".)
3. Remove the tension spring (4).
4. Remove the claws on the S, T main brakes (1), (2) from the mechanical deck lifting the S, T main brakes (1), (2) upward.
5. After replacing the S, T Main brake assemblies (1), (2), mount the parts in the reverse order of removal.

#### Note:

- When mounting the S, T main brake assemblies (1), (2) take care that both ends of the S, T main brakes (1), (2), do not touch the gear of the reel table.

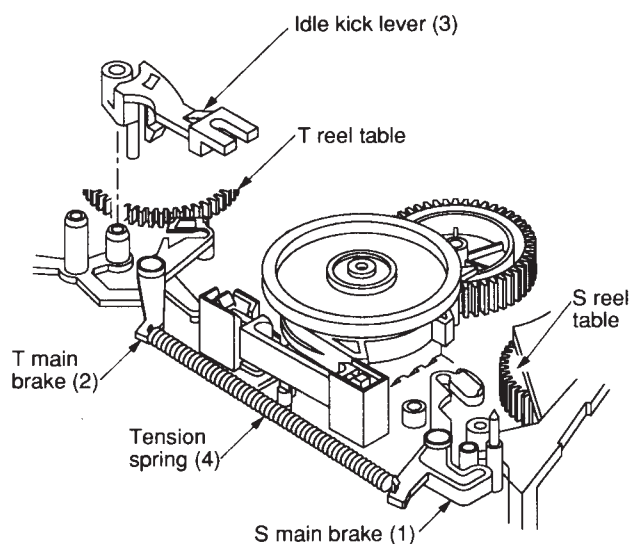


Fig. 6-37-1

### 1-6-38. S Soft Brake Replacement

1. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
2. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
3. Remove the S soft brake spring (1).
4. Remove the S soft brake (2) after removing the claw (A) on the S soft brake from the mechanical deck.

#### Note:

- When mounting the S soft brake spring (1), take care not to deform the hook (B).
- When mounting the S soft brake (2), take care of the band brake (3).

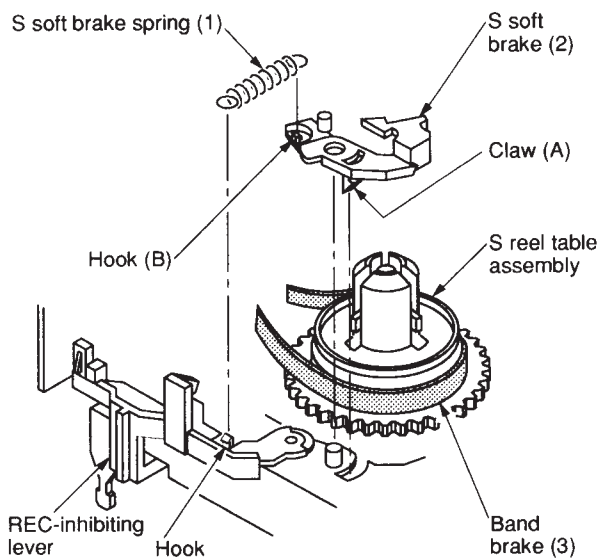


Fig. 6-38-1



### 1-6-39. T Soft Brake Replacement

1. Remove the T soft brake spring (1).
2. Remove the claw (A) on the T soft brake (2) from the mechanical deck and remove the T soft brake (2).
3. After replacing the T soft brake (2), mount the parts in the reverse order of removal.

#### Note:

- When mounting the T soft brake spring (1), take care not to deform the hook (B).
- Take care not to touch the surface (C) on the brake pad.

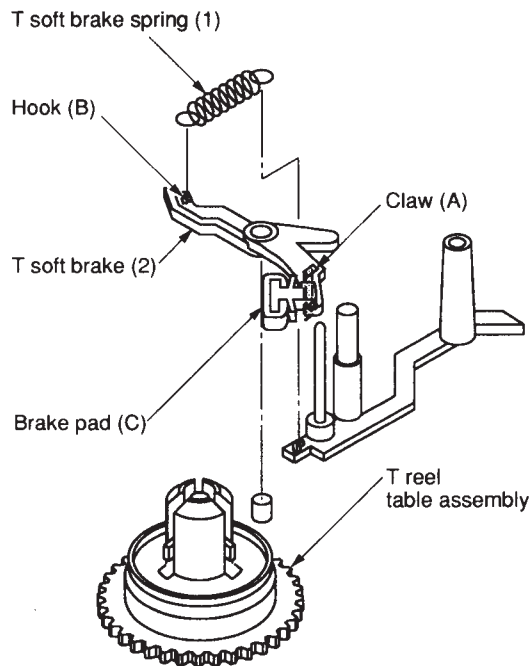


Fig. 6-39-1

### 1-6-40. Drive Lever Replacement

1. Remove the top bracket. (Refer to item "1-6-1. Top Bracket Replacement".)
2. Remove the cassette holder assembly. (Refer to item "1-6-2. Cassette Holder Assembly Replacement".)
3. Remove the drive arm assembly. (Refer to item "1-6-5. Drive Arm Assembly Replacement".)
4. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
5. Remove the Loading Drive Assembly. (Refer to item "1-6-29. Loading Drive Assembly Replacement".)
6. Remove the drive lever (1).

7. After replacing the drive lever (1), mount the parts in the reverse order of removal.

#### Note:

- Be sure to align the phase of the cam gear (2). (Refer to item 1-6-41. Cam Slider Replacement".)
- Mount the drive lever (1) so that it is positioned between the mark (A) on the mechanical deck and the outsert (B).
- Apply grease to the surface between the mark (C) on the mechanical deck and the drive lever shaft (D).

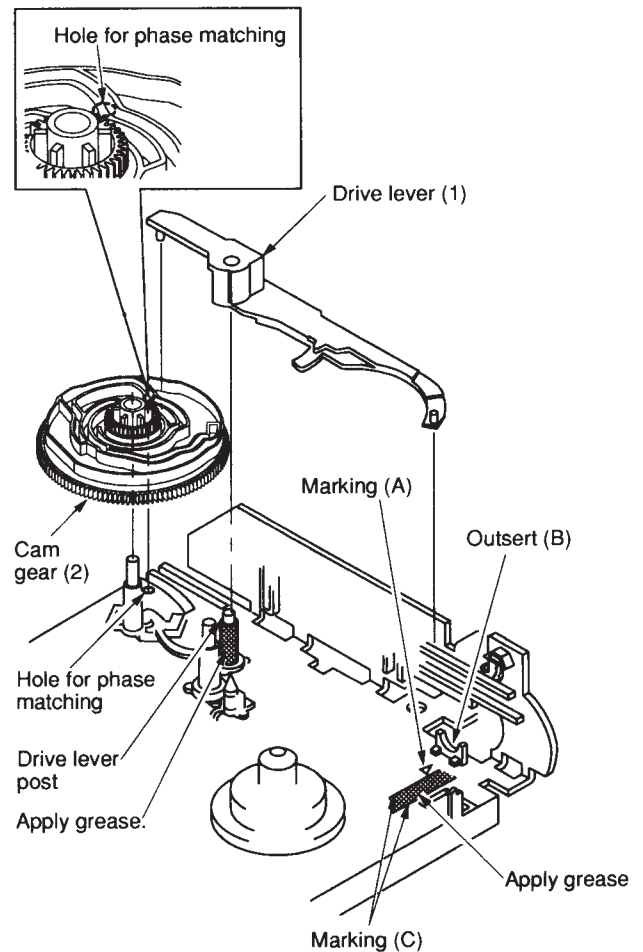
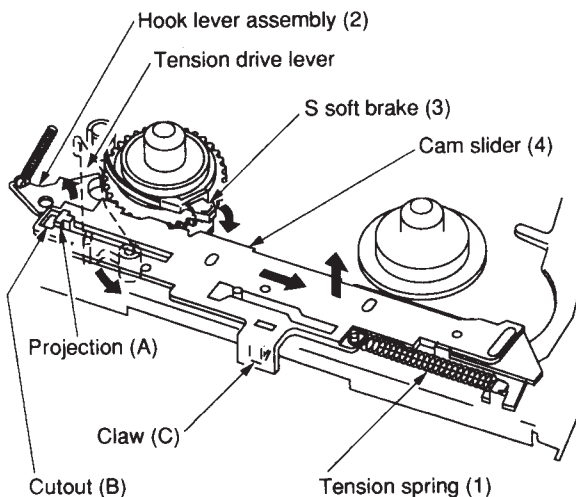


Fig. 6-40-1



### 1-6-41. Cam Slider Replacement

1. Remove the top bracket and the cassette holder assembly. (Refer to item "1-6-1. Top Bracket Replacement and 1-6-2. Cassette Holder Assembly Replacement".)
2. Remove the tension spring (1).
3. Turn the hook lever assembly (2) counterclockwise and turn the S soft brake (3) counterclockwise.
4. Move the cam slider (4) to the right and align the projection (A) on the mechanical deck and the cutout portion (B) on the cam slider (4).
5. Remove the claw (C) on the cam slider (4) and remove the cam slider (4) lifting the cam slider (4) upward.

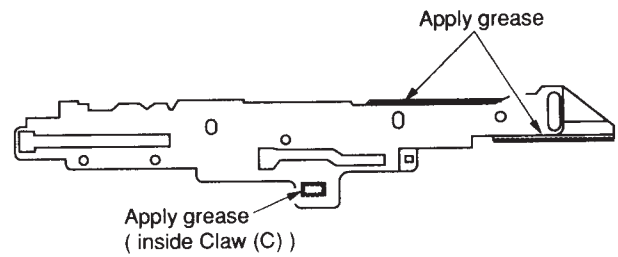


**Fig. 6-41-1**

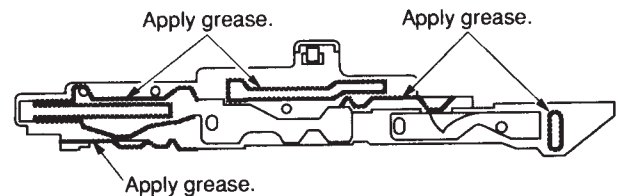
6. Apply grease on the shaded portion of a new slider for the replacement.
7. Mount the parts in the reverse order of removal. After inserting the cam slider, slide it to the left direction till it stops. (Fig. 6-26-2 shows this condition.)

#### Note:

- When mounting the cam slider (4), slide the tension drive lever in the direction shown by the arrow (counterclockwise).
- After completion of the replacement, confirm that the cam slider (4) can slide to left and right directions smoothly.



**Cam slider top side**

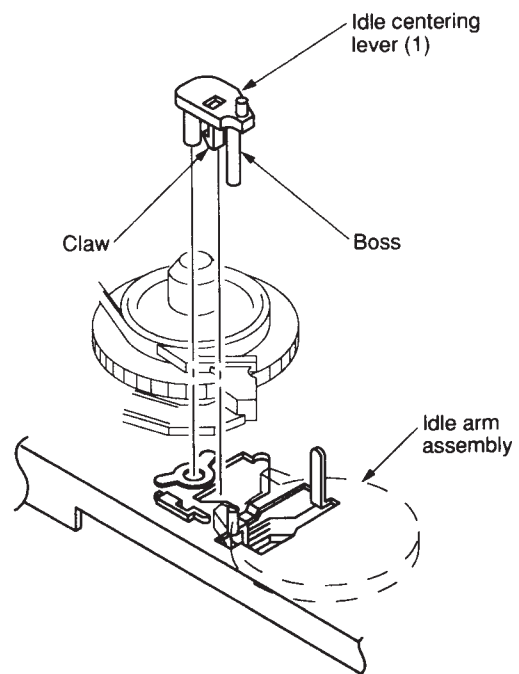


**Cam slider bottom side**

**Fig. 6-41-2**

### 1-6-42. Idle Centering Lever Replacement

1. Remove the cam slider. (Refer to item "1-6-41. Cam Slider Replacement".)
2. Remove the claw on the idle centering lever (1) and remove the idle centering lever (1) lifting it upward.
3. After replacing the idle centering lever (1), mount the part in the reverse order of removal.



**Fig. 6-42-1**

### 1-6-43. Capstan Motor Replacement

1. Remove the reel belt (1).
2. Remove one screw (2) from the bottom of the mechanical deck, and remove the PC board (3).

#### Note:

- Take care not to misuse the screw with others.

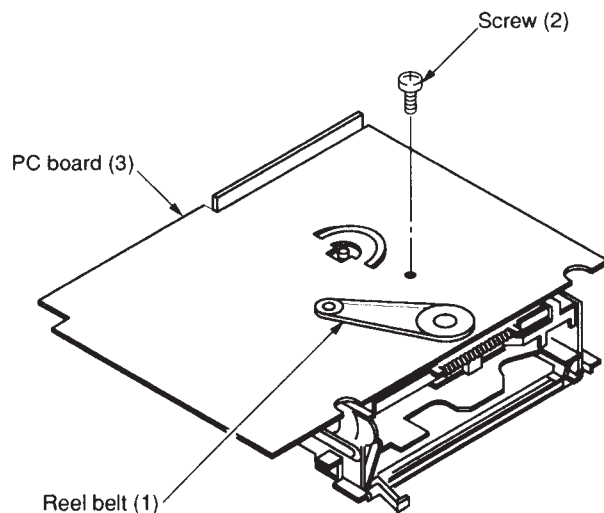


Fig. 6-43-1

3. Remove the capstan motor (4) after removing three screws (5).

#### Note:

- Take care not to drop the capstan motor.

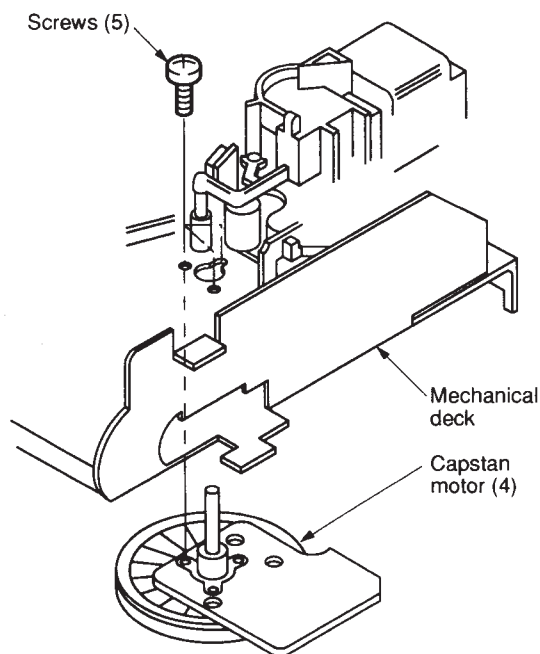


Fig. 6-43-2

4. Take care not to damage and scratch the motor itself, and mount the capstan motor (4) fitting the hole (A) on the mechanical deck and the hole (B) on the capstan motor (4).

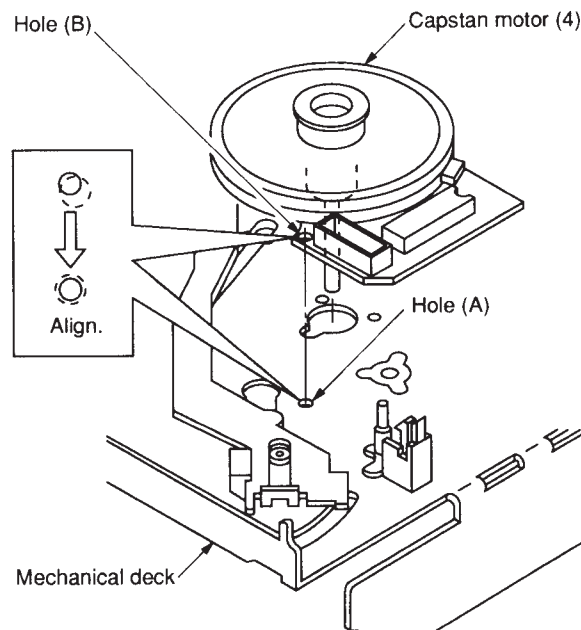


Fig. 6-43-3

5. Mount the capstan motor (4) with three screws (5) viewing from the top side of the mechanical deck.

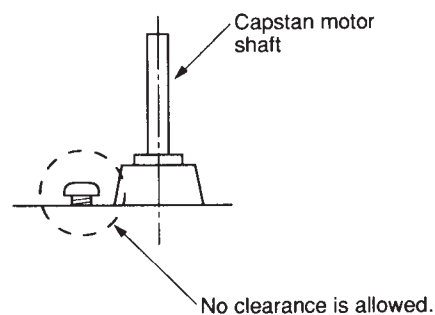


Fig. 6-43-4

#### Note:

- Do not use once-removed screws again.
- Take care that no clearance is allowed when securing three screws.

6. After replacement, mount the parts in the reverse order of removal.

#### Note:

- In this case, take care not to twist the reel belt and stick the grease or etc. on it.
7. After replacing, perform the adjustment according to the tape transport adjustment procedures.

#### 1-6-44. S-VHS Switch Assembly Replacement (S-VHS model only)

1. Slide the cassette holder assembly (1) until the screw (2) can be seen from the hole on the top bracket (3).
2. Insert a screwdriver from the hole provided on the top bracket (3) and secure the screw (2).
3. Remove the S-VHS switch assembly (4) upward.
4. After completion of the replacement, mount the parts in the reverse order of removal.

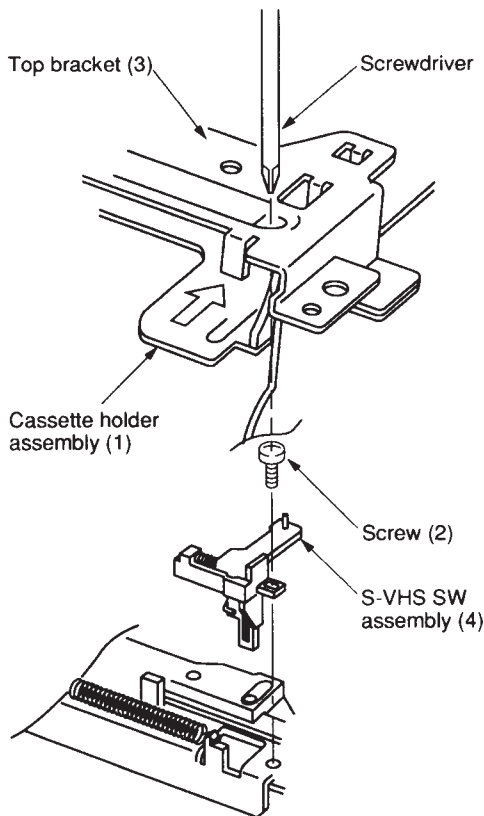


Fig. 6-44-1

#### 1-7. Check and Adjustment

##### 1-7-1. Check of Tension Pole Position

1. Turn the worm wheel counterclockwise after removing the cassette holder assembly on the front loading mechanism, and set the cam gear at playback position.
2. Turn the S reel table assembly (1) clockwise slowly.
3. Adjust the adjuster (3) counterclockwise from the position shown in Fig. 6-23-1 so that the clearance between the left end of the tension lever assembly (2) and the left side of the mechanical deck becomes  $7.5 \pm 1$  mm.

##### Note:

- There is a long mark at the position of 7.5 mm from the round surface of the mechanical deck. Make sure the position of the mark when adjusting.

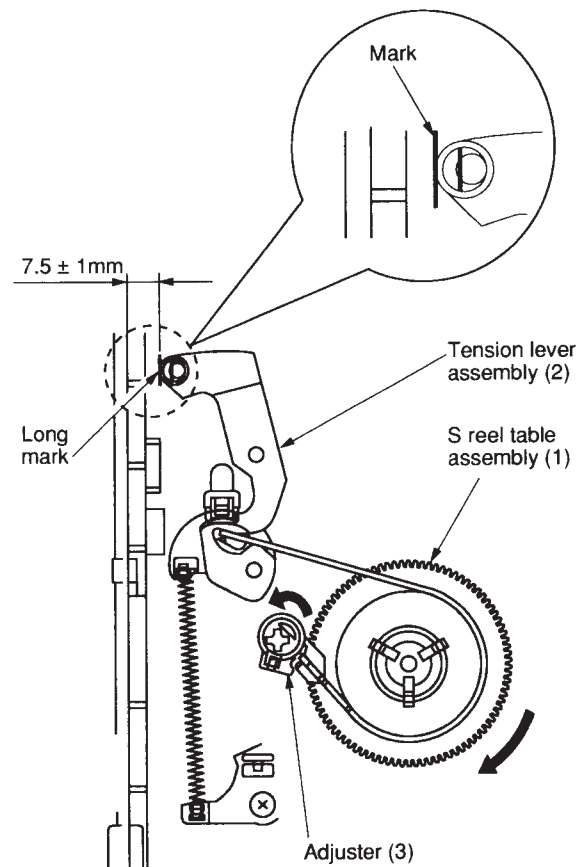


Fig. 7-1-1

## 1-7-2. Reel Torque Check

### (1) Reel torque

#### 1. REVIEW mode (supply side)

Poor torque may not wind the tape. On the other hand, excessive torque will cause damage to the tape during REVIEW mode.

#### 2. Record/Playback mode (take-up side)

Too little torque does not rewind the tape to the end. If too large torque, the tape may be stretched by excessive tension.

#### 3. Inspection

Rewind the torque cassette to the end, then check the torque values shown below:

Review	$15.95 \pm 3.65 \text{ mN}\cdot\text{m}$ ( $162.5 \pm 37.5 \text{ g}\cdot\text{cm}$ )
--------	--

Record/Playback	$6.85 \pm 2.45 \text{ mN}\cdot\text{m}$ ( $70 \pm 25 \text{ g}\cdot\text{cm}$ )
-----------------	--

For checking method, refer to the following item (2).

### (2) Reel torque and back tension check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette tape (KT-300NR) in the VTR and feed it forward until the end of the tape, before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15s, and then make sure the take-up torque described above is obtained while observing the left torque meter.
4. After completion of step 3), feed forward to tape start position and set the VTR to the PLAY mode and feed the tape for about 30s. Read the right torque meter and check the torque described above is obtained.
5. If the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the S reel table assembly, the T reel table assembly and the idle arm assembly are replaced, perform the reel torque check.

## <Precautions for Use of Torque Cassette (KT-300NR)>

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
  - Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but return the tape to its correct position, taking care not to damage the tape.
  - Make sure the tape is not slackened. If slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
  - After above confirmation, proceed to the reel torque adjustment and confirmation.
3. Caution for removal of torque cassette
  - When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
4. If the previous precautions 1), 2) and 3) are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180, 10 m in length.

### 1-7-3. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape transport system were replaced.

Electrical signal output terminal required for adjustment differs depending upon the models. Refer to the test point location in the Electrical Adjustment Section.

### (1) Location of tape transport adjustment

#### <Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

Rectangles shown in Figs. 7-3-1, 7-3-2 show the adjusting locations.

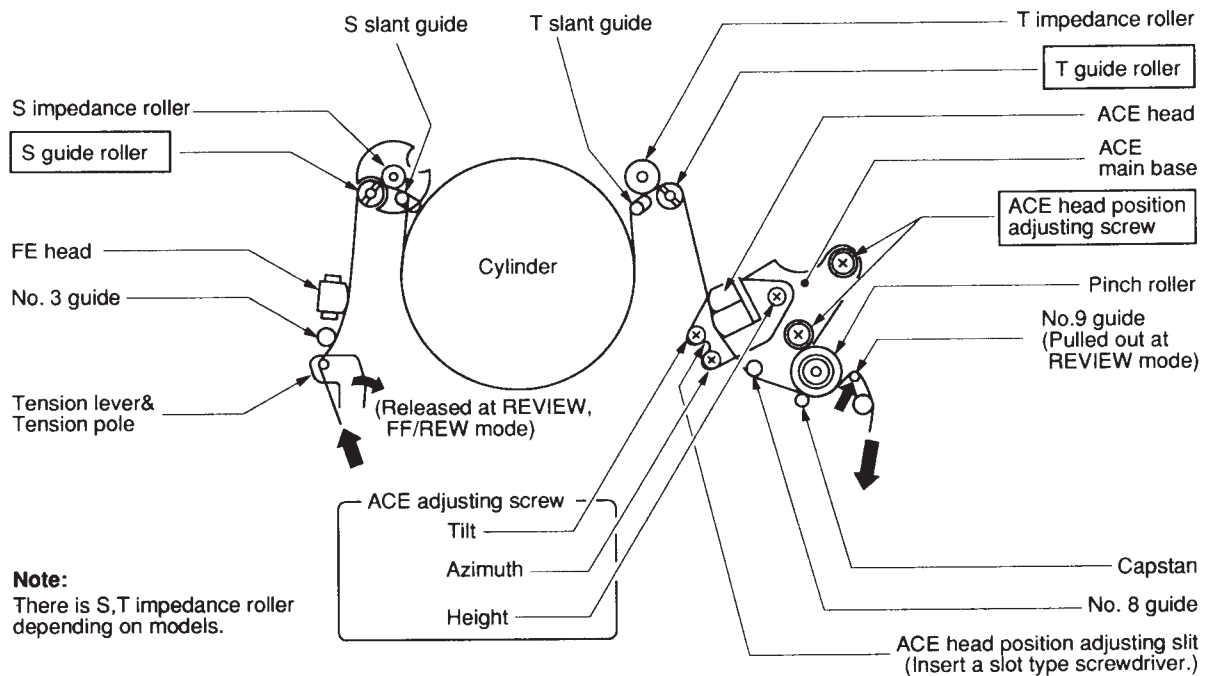


Fig. 7-3-1 Tape travel diagram

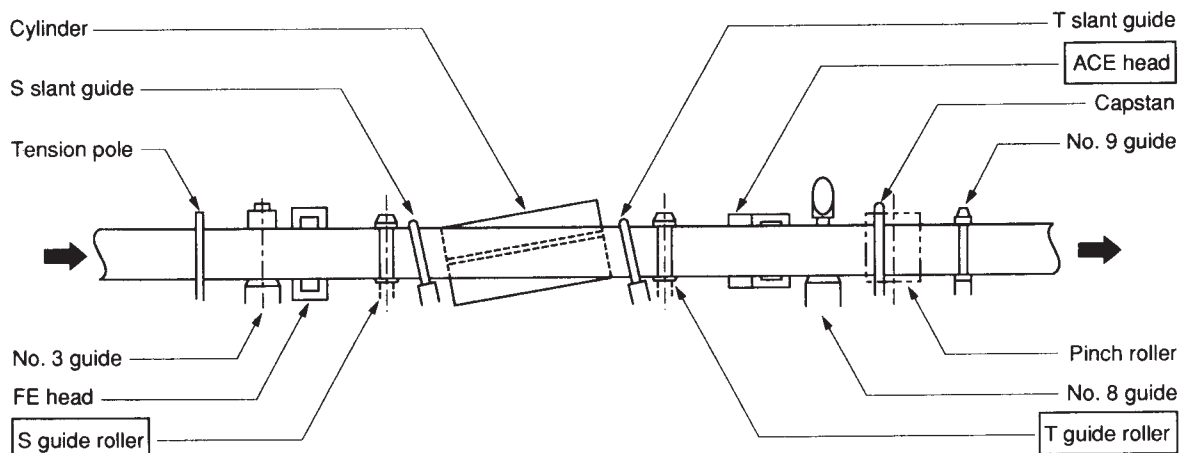
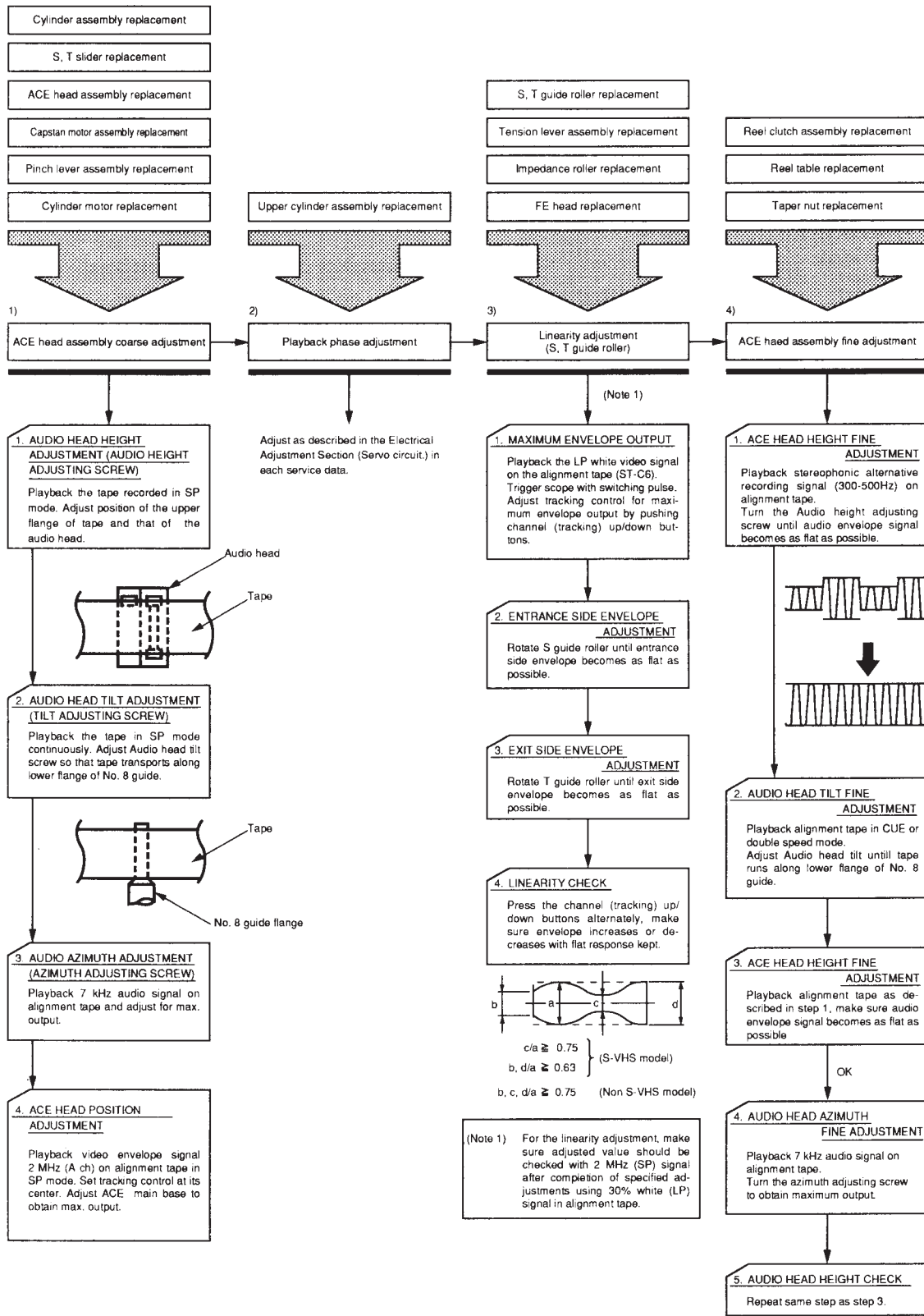
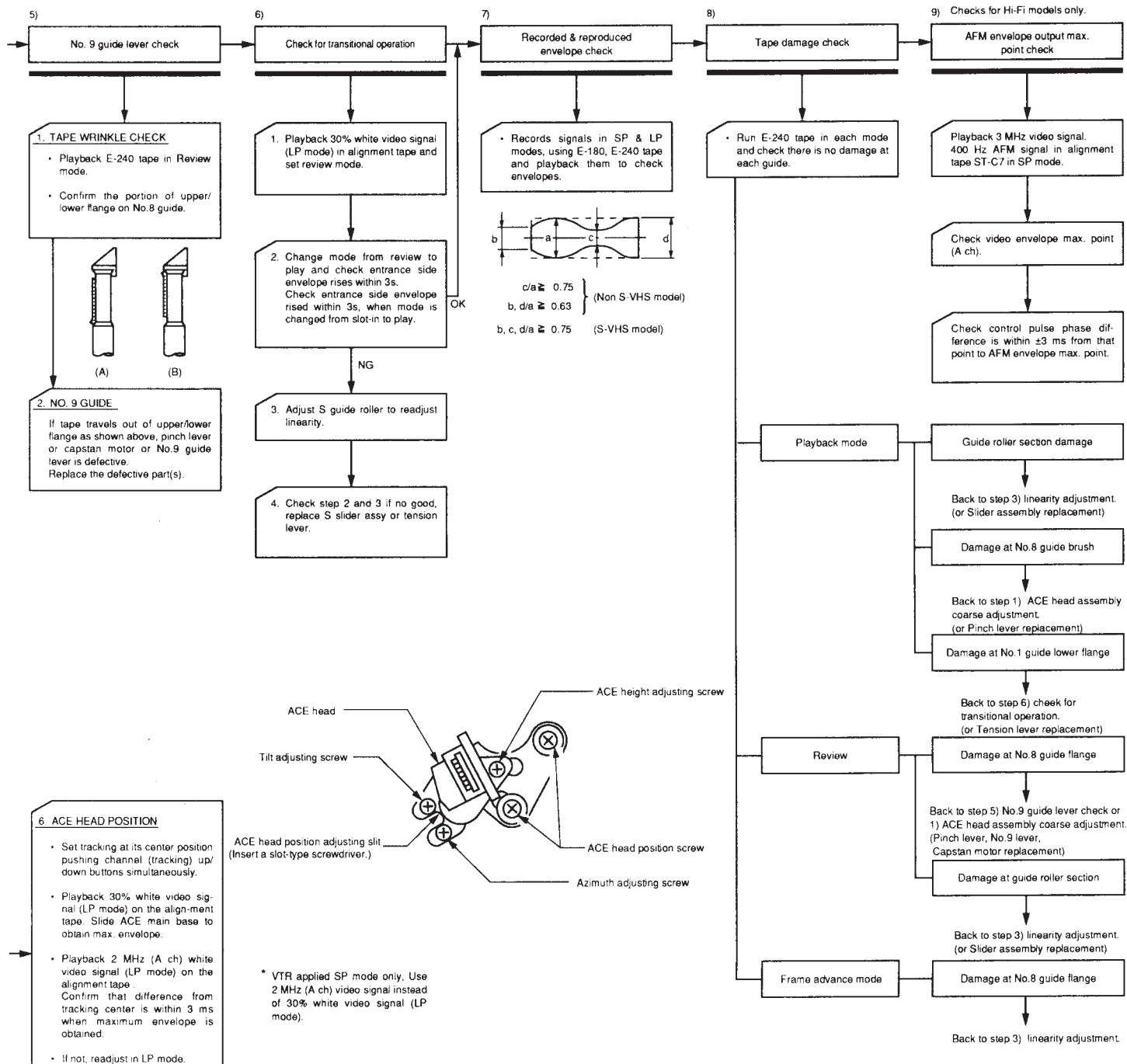


Fig. 7-3-2 Location of tape transport adjustment

## (2) Tape transport system adjustment flow chart







### (3) Tape transport system adjustment

#### <Pre-adjustment>

When the part(s) listed in Table 7-3-1 is replaced, perform required adjustments by referring to procedures for the tape transport system. When the part(s) listed in Table 7-3-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T guide rollers, turn the S, T guide rollers until wrinkle disappears.
2. If tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.

Table 7-3-1

Parts replacement	Adjustment procedure
<ul style="list-style-type: none"> <li>• Cylinder assembly</li> <li>• S, T sliders</li> <li>• ACE head</li> <li>• Pinch lever assembly</li> <li>• Capstan motor</li> <li>• No. 9 guide lever assembly</li> </ul>	From item 1)
<ul style="list-style-type: none"> <li>• Upper cylinder</li> </ul>	From item 2)
<ul style="list-style-type: none"> <li>• S, T guide rollers</li> <li>• Tension lever assembly</li> <li>• FE head</li> </ul>	From item 3)
<ul style="list-style-type: none"> <li>• Reel clutch assembly</li> <li>• S, T reel tables</li> </ul>	From item 4)

#### <Adjustment procedures>

##### 1) ACE head assembly coarse adjustment

###### a. Audio head height adjustment

1. Play back the tape recorded in the SP mode. Observe the surface of the ACE head.
2. Turn the ACE height adjusting screw so that upper tape edge matches to the upper edge of the audio head core.

###### b. ACE head tilt adjustment

1. Play back the tape recorded in the SP mode and observe running condition of the tape at the lower flange of No.8 guide.

2. Turn the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 7-3-4 (A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 7-3-4 (B).

##### c. Audio head azimuth adjustment

1. Play back the 7 kHz audio signal on the alignment tape in the SP mode.
2. Connect a millivoltmeter or oscilloscope to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

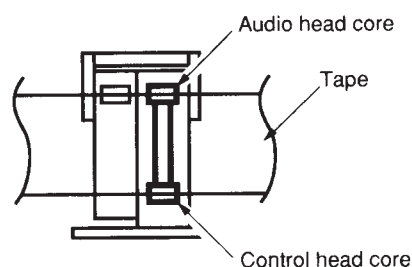


Fig. 7-3-3

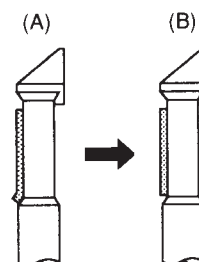


Fig. 7-3-4 No. 8 guide rough adjustment

##### d. ACE head position adjustment

1. Play back the 2 MHz video envelope signal in the alignment tape in the SP mode. Loosen the ACE head position securing screw.
2. Insert a slot-type screwdriver into the ACE head position adjusting slit on the ACE main base and adjust the ACE main base so that the video envelope reaches a peak level at the tracking center position when the channel (tracking) up/down buttons of VTR are pressed simultaneously.

## 2) Playback phase adjustment

1. Perform the adjustment according to the methods stated in the electrical adjustment (servo circuit).

## 3) Linearity adjustment

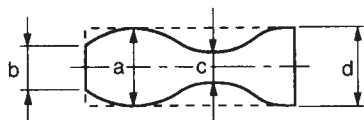
1. Play back the LP mode white video signal on the alignment tape.

### Note:

- For models SP mode only, use the 2 MHz (A ch) video signal in the SP mode.
2. Trigger the scope with the switching pulse to issue the envelope signal output.
  3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 7-3-5. Again make sure the same by playing back the SP mode 2 MHz video signal on the alignment tape. If not satisfied, adjust as follows:

### Note:

- a = maximum output of the video RF envelope  
b = minimum output of the video RF envelope at the entrance side  
c = minimum output of the video RF envelope at the center point of cylinder  
d = minimum output of the video RF envelope at the exit side of cylinder



$$\left. \begin{array}{l} c, b, d/a \geq 0.75 \quad (\text{S-VHS model}) \\ b, d/a \geq 0.63 \\ c/a \geq 0.75 \end{array} \right\} (\text{Non S-VHS model})$$

Fig. 7-3-5

4. If the (A) section in Fig. 7-3-6 does not meet the specifications, adjust the S guide roller in up or down direction.
5. If the (B) section in Fig. 7-3-6 does not meet the specifications, adjust T guide roller in up or down direction.

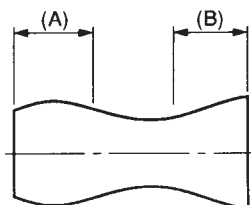


Fig. 7-3-6

6. After completion of the adjustment(s), push the channel (tracking) up/down button and make sure video envelope variations are almost flat. Next, play back the 2 MHz SP mode video signal on the alignment tape and make the video RF envelope variations are also flat when channel (tracking) UP/DOWN buttons is pushed.
7. If the envelope varies like NG figures as shown in Fig. 7-3-7, perform the adjustment again. Smooth secondary curves are allowable level.

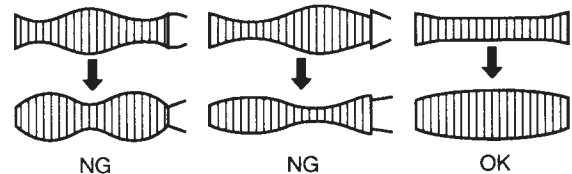


Fig. 7-3-7 Abnormal waveform variation

## 4) ACE head assembly fine adjustment

### a. ACE head height fine adjustment

1. Play back the stereophonic alternative recording 300 – 500 Hz audio signal on the alignment tape.
2. Adjust the ACE height adjusting screw so that the signal envelope is obtained almost flat.

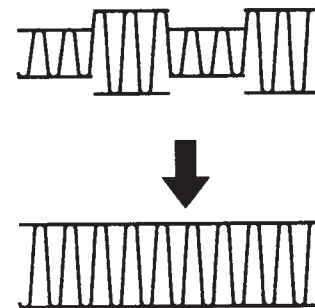


Fig. 7-3-8

### Note:

- If there is no alignment tape (ST-C6, ST-C7), do not perform this item "a. ACE head height fine adjustment", and perform the process of the note in item "e. Audio head height check" described later.

#### **b. ACE tilt adjustment**

1. Observe the lower flange of No. 8 guide. If any wrinkle is observed, turn the ACE tilt adjusting screw counterclockwise until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, turn the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

#### **Note:**

- This adjustment is performed easily in SP mode playback, double speed playback mode or CUE mode.

#### **c. Audio head height check**

1. Play back the stereophonic alternative recorded 300 – 500 Hz audio signal as described in the step 4)-a, and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a again.

#### **d. Audio azimuth adjustment**

1. Play back the 400 Hz, 7 kHz audio signal on the alignment tape.
2. Turn the ACE azimuth adjusting screw until the maximum audio output is obtained.

#### **e. Audio head height check**

1. Play back the alignment tape described in step 4)-a and check if the audio envelope is flat. If not, repeat the adjustment described in step 4)-a.

#### **Note:**

- If there is no alignment tape (ST-C6, ST-C7), perform the audio height alignment using the current alignment tape at this adjustment step.

1. Playback the 400 Hz audio signal (SP mode) on the alignment tape.
2. Turn each three alignment screw of the ACE head to the same direction in 45 degrees steps evenly so that the audio output level becomes maximum.
3. Perform the confirmation and adjustment for the tilt and the azimuth again.

#### **f. ACE head position adjustment**

1. Play back the white envelope (LP mode) on the alignment tape.
2. Push the channel (tracking) up/down buttons simultaneously and reset the tracking at its center position.

3. Trigger the oscilloscope with the video switching pulse and observe the video envelope waveform.
4. Slide the ACE main base until the maximum envelope output is obtained as described in ACE head position coarse adjustment.
5. Play back the 2 MHz video signal (SP mode) on the alignment tape.
6. Make sure the envelope output is maximum when the tracking control is placed at its center position. If no envelope output is obtained with the tracking control set to the center position, again adjust it for maximum envelope output in SP and LP modes. When envelope output is maximum in the LP mode at the tracking center, difference with the case in the SP mode is within 3 ms.
7. Tighten the ACE head position fixing screw and secure the ACE main base.
- g. After completion of ACE head fine adjustment, apply screw lock to two screws (tilt, azimuth adjusting screws) in front of the ACE head.

#### **5) No. 9 guide lever adjustment**

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Check the tape does not come off from the flange while running. If the tape comes off from the flange, replace the pinch lever, capstan motor or No. 9 guide lever since the part(s) is (are) defective.

#### **Note:**

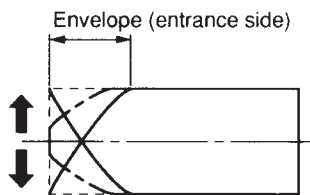
- Modify the lid of the cassette for the alignment tape E-240 previously so that the alignment is performed easily.

#### **6) Check for transitional operation from Review to Play, slot-in to play**

1. Play back the LP mode white video signal on the alignment tape in Review mode and observe the video envelope with the oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3s as shown in Fig. 7-3-9.

If it does not rise within 3s, take the following steps starting 4).

3. Switch the cassette slot-in mode to the Play mode. As in item 2), if it does not rise within 3s, adjust as follows.



**Fig. 7-3-9 Video envelope rising when operation mode is switched from review to play mode**

4. Adjust the S guide roller and perform the linearity adjustment again.
5. Check above items 2) and 3) to see that the video envelope rises within 3s. If not, S slider assembly or the tension lever is damaged. Replace either (or both) of them.

**Note:**

- If the rising characteristic is poor in Review mode, screen noise may occur in synchronous editing recording. Perform the adjustment carefully.

**7) Envelope check**

1. Make recordings and play back the tapes (E-180 and E-240) in SP and LP modes and make sure the playback output envelope meets the specifications shown in Fig. 7-3-5.
2. In playback the tape (with a E-180), the video envelope should meet the specification as shown in Fig. 7-3-10.

**Note:**

- Check for both modes, SP and LP. Also check for AFM envelope when using a Hi-Fi model.



- $B/A \geq 0.55$
- $B \geq 120\text{mV}$

**Fig. 7-3-10 Envelope output and output difference**

3. If the performance does not meet both specifications above 1 and 2 above, replace the upper cylinder assembly.

4. Set the VTR to Rec mode (LP) with the E-180 tape loaded (at the beginning part) and check operation of the synchronous editing recording.
5. If picture noises are observed at the starting position of the editing, perform "6) Check for transitional operation from Review to Play, slot-in to play".

**8) Tape wrinkle check**

1. Playback the E-240 tape in the normal Play mode, CUE mode, Review mode and the frame advance mode, and check each guide for wrinkle.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below. (The parts described in ( ) may need to replace.)

**a. Playback mode**

Tape wrinkle at the S, T-guide rollers section

Item 3) Linearity adjustment  
(Slider assembly)

Tape wrinkle at No. 8 guide flange

Item 1) ACE head assembly coarse adjustment  
(Pinch roller)

Tape wrinkle at lower flange of No. 1 guide

Item 6) Check for transitional operations from  
Review to Play, and Slot-In to Play  
(Tension lever)

**b. Review mode**

Tape wrinkle at No. 8 guide

Item 1) ACE head assembly coarse adjustment  
(Pinch lever, No. 9 guide lever,  
capstan motor)

Tape wrinkle at the guide rollers

Guide roller adjustment (Slider assembly)

**c. Frame advance mode**

Tape wrinkle at No. 8 guide

Item 3) Linearity adjustment  
(Pinch lever, capstan motor)

## 9) Maximum AFM envelope output point check (Hi-Fi model)

1. Playback the SP mode 3 MHz video signal and the 400 Hz AFM signal on the alignment tape.
2. Trigger the oscilloscope with the video switching pulse, adjust the tracking control and check the control pulse phase at the maximum video envelope (A ch) output point.
3. Make sure the control pulse phase difference among each maximum point of AFM envelope, Ach and Bch is within  $\pm 3$  ms with the above point used as the basic reference.

### Note:

- If the phase difference exceeds 3 ms, replace the upper cylinder.

## 2. ELECTRICAL ADJUSTMENT

### <Test equipment required>

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20 k $\Omega$ /V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes  
Part code: ST-C6: 70909409, ST-C7: 70909410
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

### <Color bar signal>

Color bar signals of 75% recorded on the alignment tapes are shown in Fig. 2-1-1.

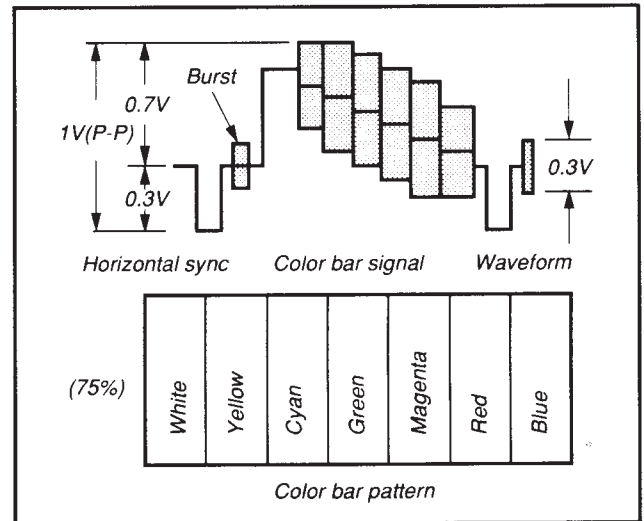


Fig. 2-1-1

### <Specified input and output levels, and impedance>

- Video input: Negative sync, standard composite video signal 1 V(p-p), 75 $\Omega$
- Video output: Same as the video input 1 V(p-p), 75 $\Omega$
- Audio input: 308 mV(rms), more than 47 k $\Omega$  (phono type), more than 10 k $\Omega$  (21 pin type)
- Audio output: 308 mV(rms), less than 4.7 k $\Omega$  (phono type), less than 1.0 k $\Omega$  (21 pin type)

### <Alignment sequence>

Recorded the alignments in the sequence as shown in Fig. 2-1-2.

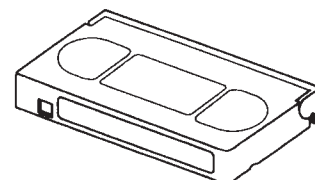
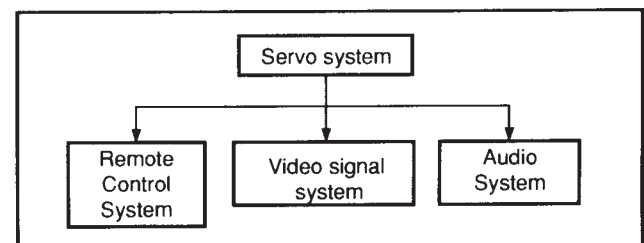


Fig. 2-1-2



## Alignment tape specifications

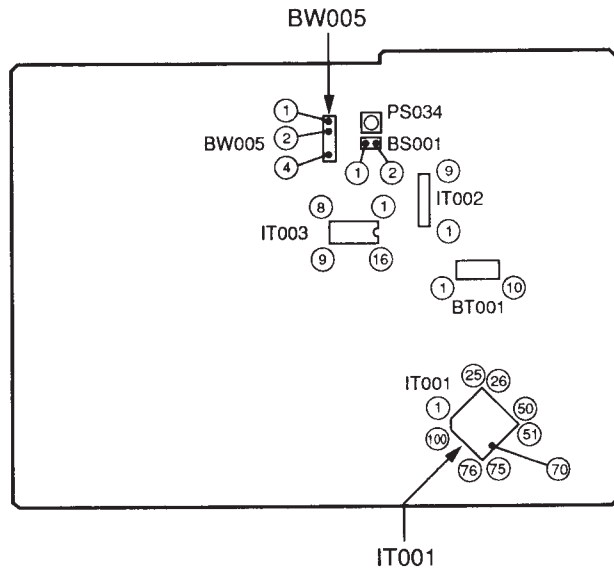
### [1] ST-C6

Segment	System	Playback Time (min)	Video Signal	Audio Signal	Applications
1	PAL & SECAM	10	Mono Scope	1 kHz	Playback phase check, audio level check
2	PAL & SECAM	5	3 MHz A ch	400 Hz and 7 kHz	ACE head position adjustment, ACE head azimuth adjustment, Linearity adjustment
3	PAL & SECAM	5	3 MHz A ch	1 kHz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
4	PAL	5	Color bar	3 kHz	Video and Sound checks
5	SECAM	5	Color bar	3 kHz	Video and Sound checks
6	MESECAM	5	Color bar	3 kHz	Video and Sound checks
7	NTSC	5	Color bar	1 kHz	Video and Sound checks

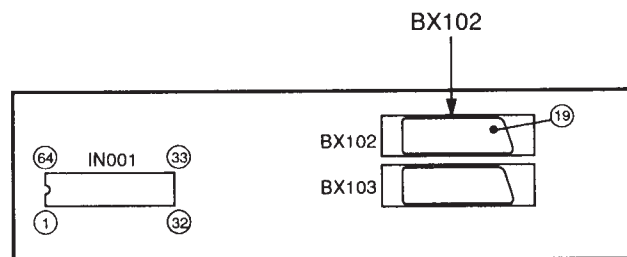
### [2] ST-C7

Segment	System	Playback		Video Signal	Audio Signal	Applications
		Time (min)	Mode			
1	PAL	5	LP	3 MHz A ch	500 Hz (stereo)	ACE head position adjustment, ACE head height adjustment, Linearity adjustment
2	PAL	3	LP	Color bar	3.2 kHz	LP mode operation check, ACE head azimuth check and adjustment
3	PAL	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check
4	PAL & SECAM	5	SP	3 MHz A ch	AFM 400 Hz	AFM tracking checks
5	SECAM	5	LP	3 MHz A ch	No signal	Linearity adjustment
6	SECAM	3	LP	Color bar	No signal	LP mode operation check
7	SECAM	3	SP	Color bar	AFM 400 Hz	SP mode operation check, AFM check

## 2-1. Servo Circuit



**Main PC Board**



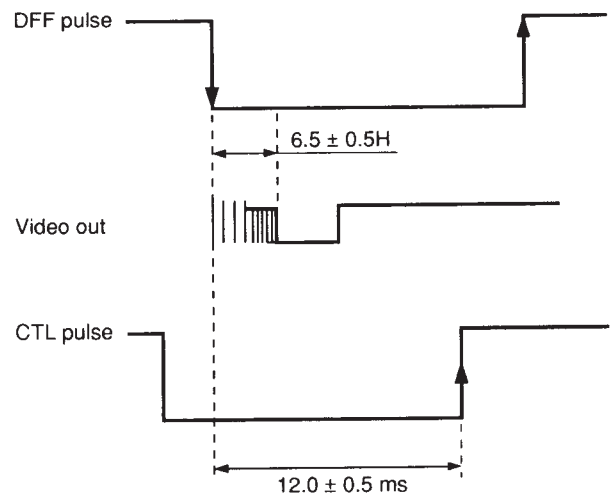
**Terminal PC Board**

### 2-1-1. Playback Phase (PG) Adjustment

**Test point:** Pins 1 and 2 of BW005, Pin 19 of BX102 (Video out)

**Test equipment:** Oscilloscope

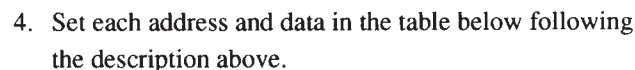
1. During playback press the VTR's channel up and down buttons simultaneously to reset to tracking center.
2. Confirm that phase difference between the fall of the DFF pulse (pin 1 of BW005) and the rise of CTL pulse (pin 2 of BW005) is  $12 \pm 0.5$  ms.
3. Further, observe the envelope (pin 4 of BW005) waveform, and confirm that the ACE head position adjustment and linearity adjustment have been made, and C-SYNC (pin 70 of IT001) is being input during playback.
4. Set the VTR to the STOP mode.



5. Press the unit's channel up/down buttons simultaneously for more than 5s.
6. Afterwards, within 2s, press the PLAY button on the remote controller.
7. The automatic adjustment will be made for about 10s, all the displays will blink. If the automatic adjustment is not carried out, confirm that the alignment tape has a safety tab or not, and redo from the step 3.
  - 1) When adjustment has been completed:  
The display will blink for 10s, stop blinking and return to the normal display in the STILL mode, then it shifts to the playback display in the playback mode.
  - 2) When adjustment fails:  
It goes into the STOP mode.
8. Confirm that the play indicator is displayed, and confirm that the rising and falling edge of the SW pulse is  $6.5 \pm 0.5H$  from the V-sync front edge of the video signal.

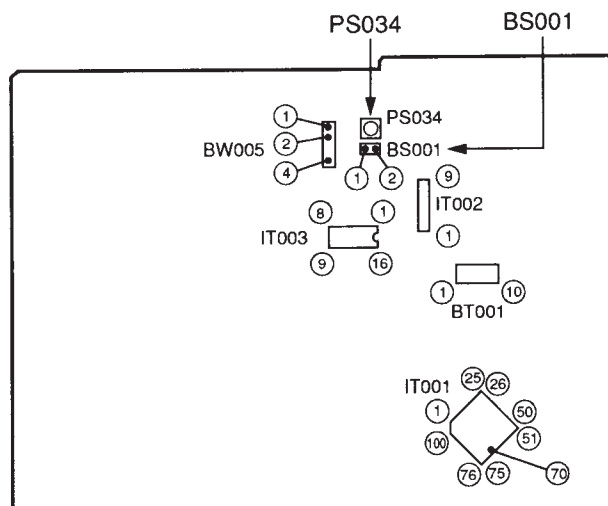
When IC504 is replaced, the data in the VTR is required to memorize in the new one. So perform the following procedures.

- Next, set the data to 4b using the FF/REW buttons on the remote controller. The data goes up using FF button and down using REW button.



Address	Data
24	0A
25	03
26	15
27	0A

- ## 2-2. Audio Circuit



## Main PC Board

**Test point:** Pins 1 and 2 of BS001

**Test equipment:** Millivoltmeter

**Adjusting point: PS034**

1. Set the VTR to record mode.
2. Connect pin 2 to the millivoltmeter and pin 1 to ground.
3. Adjust PS034 to obtain  $3.6 (300 \mu A) \pm 0.1 \text{ mV (rms)}$ .

## 2-3. Self Diagnosis Function

### 2-3-1. Outline

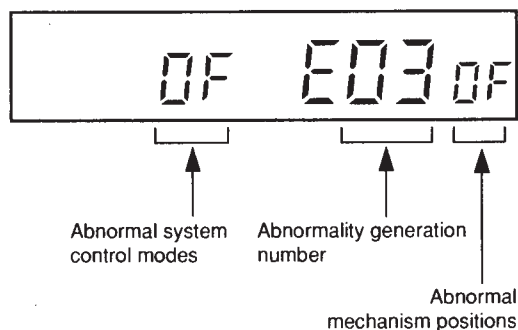
When a tape running stops or the VTR enters the power OFF mode, etc. due to some abnormality, the abnormality is stored in the EEPROM and displayed on the display tube.

### 2-3-2. Storing abnormal modes

- The abnormality is classed into 5 groups, and the abnormality number, system control mode, and the mechanism position at which the abnormality occurred are stored in the EEPROM.
- The writing timing is just after the abnormality occurred.

### 2-3-3. Abnormality mode display

- Press the CH UP and CH DOWN buttons on the VTR simultaneously for more than 5s.
- And then within 2s, press the STILL button on the remote control.
- The system control mode at which the abnormality occurred is displayed at the channel display area, "E" is displayed at the hour digit, abnormality generation number is displayed at the minute digit, and the mechanism position is displayed in the second digit position.
- The abnormality mode is displayed regardless of the power on off.



- When the Counter Reset button is pressed in the display period, the abnormality display data is initialized and "-" is displayed.

The data displayed are as follows:

#### Abnormality generation number

01	Cylinder stop
02	Reel abnormality (take up)
03	Reel abnormality (supply)
04	Abnormal slot in/ slot out
05	Abnormal loading

#### Abnormal system control modes

00	Standby
01	Stop
02	Rewind
03	Review
04	FF
05	Cue
06	Playback
07	Still, slow playback
08	X2 speed
09	Unloading stop
0A	Reverse playback
0B	Still in reverse playback, Reverse slow playback
0C	Recording
0d	Record pause
0E	Power off eject
0F	Eject
10	Short FF
11	Short REW

#### Abnormal mechanism positions

01	F/L out
03	F/L down
05	Loading/unloading
07	Reverse rotation with pinch roller ON
09	Playback with pinch roller ON
0b	Stop with main brake ON
0d	FF/REW
0F	Position detection impossible

Positions 0, 2, 4 exist as mechanism positions.  
For example, 8 shows a position between 7 and 9  
(between playback position and review position).

### 2-3-4. Cylinder rotation time display

#### (1) Outline

All the time for which the cylinder is ON is counted, memorized on EEPROM, and indicated on the display tube.

#### (2) Display method

- Press the "CH UP" and "CH DOWN" button on the main unit for more 5 sec. at the same time.
- Next, within 2 sec. press the "STOP" button on the remote control.
- The cumulative operation time of the cylinder will be displayed for 30 sec. The time unit is an hour.

#### (3) Example of display

- In case of 1234 hours.



- In case of 4 hours.





# SECTION 3

## SERVICING DIAGRAMS

### 1. INSPECTION PROCEDURE

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. Power SW ON	Time setting Timer/counter, Memory  Channel selection, AFC operation, EE picture & tone quality	Clock setting operation Mode display lamp TV receive condition, Channel select operation, AFC operation level, EE picture quality, Tone signal level	KDB Power Logic RF reception Video (EE, REC mode) Audio (EE, REC mode)	3-13 3-11 3-17 3-12 3-24 3-27	3-38 3-31 3-44 3-34 3-50 3-56
2. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Casette-out	F/L mechanism operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-17	3-44
3. Key Entry Operation  Remote Control	REC, PLAY Cue/Review Still, Frame advance/slow FF/REW	VTR display, OSP Each mode operation (Tape drive operation) Abnormal sound	KDB Logic	3-13 3-17	3-38 3-44
4. Special Functions Counter Functions  Tracking	Linear time counter, Index/skip search, Time search Digital auto tracking	Each mode operation  Mode operation	Servo/Logic  Servo/Logic	3-17  3-17	3-44  3-44
5. Playback Function Picture Sharpness Tone Quality Othres	PLAY (Test tape: ST-C6, ST-C7) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-24 3-27 3-17	3-50 3-56 3-44
6. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-24 3-27 3-17	3-50 3-56 3-44

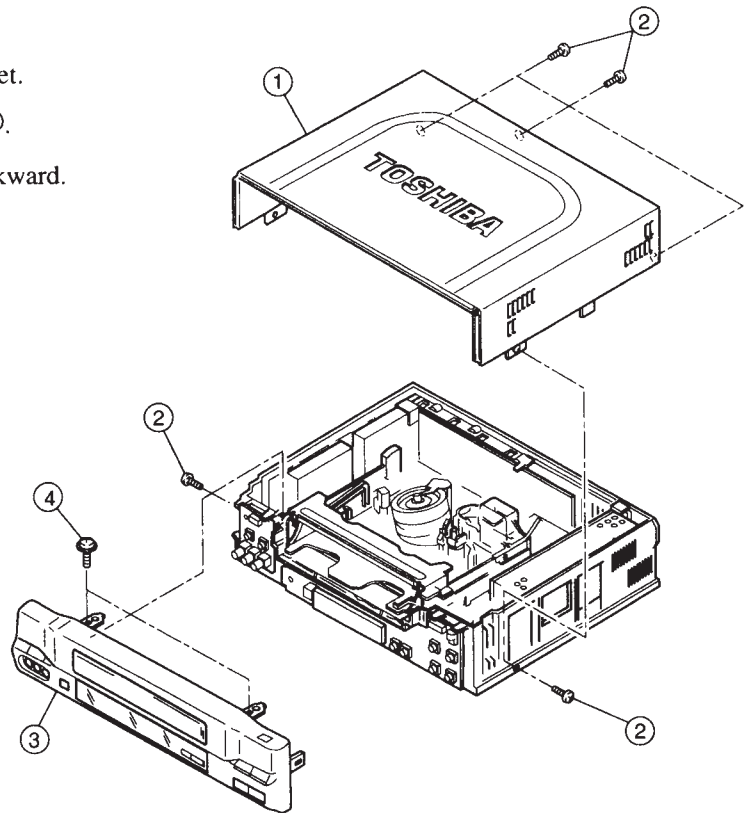
#### How to use the table

1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.

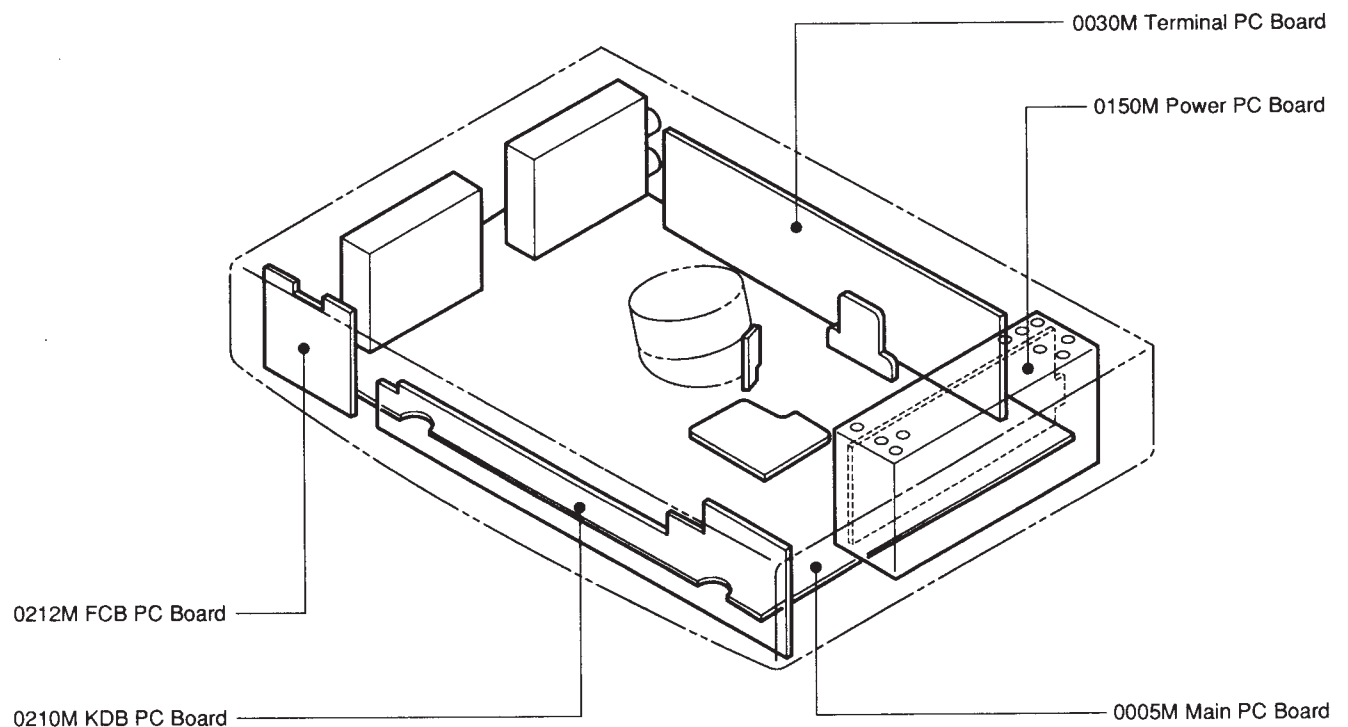


## 2. REMOVAL OF CABINET

1. Disconnect power cord plug from AC outlet.
2. Remove 5 screws ② securing top cover ①.
3. Remove the top cover ① by sliding it backward.
4. Remove 2 screws ④.
5. Remove the front panel ③.



## 3. ELECTRICAL UNITS LOCATION DIAGRAM



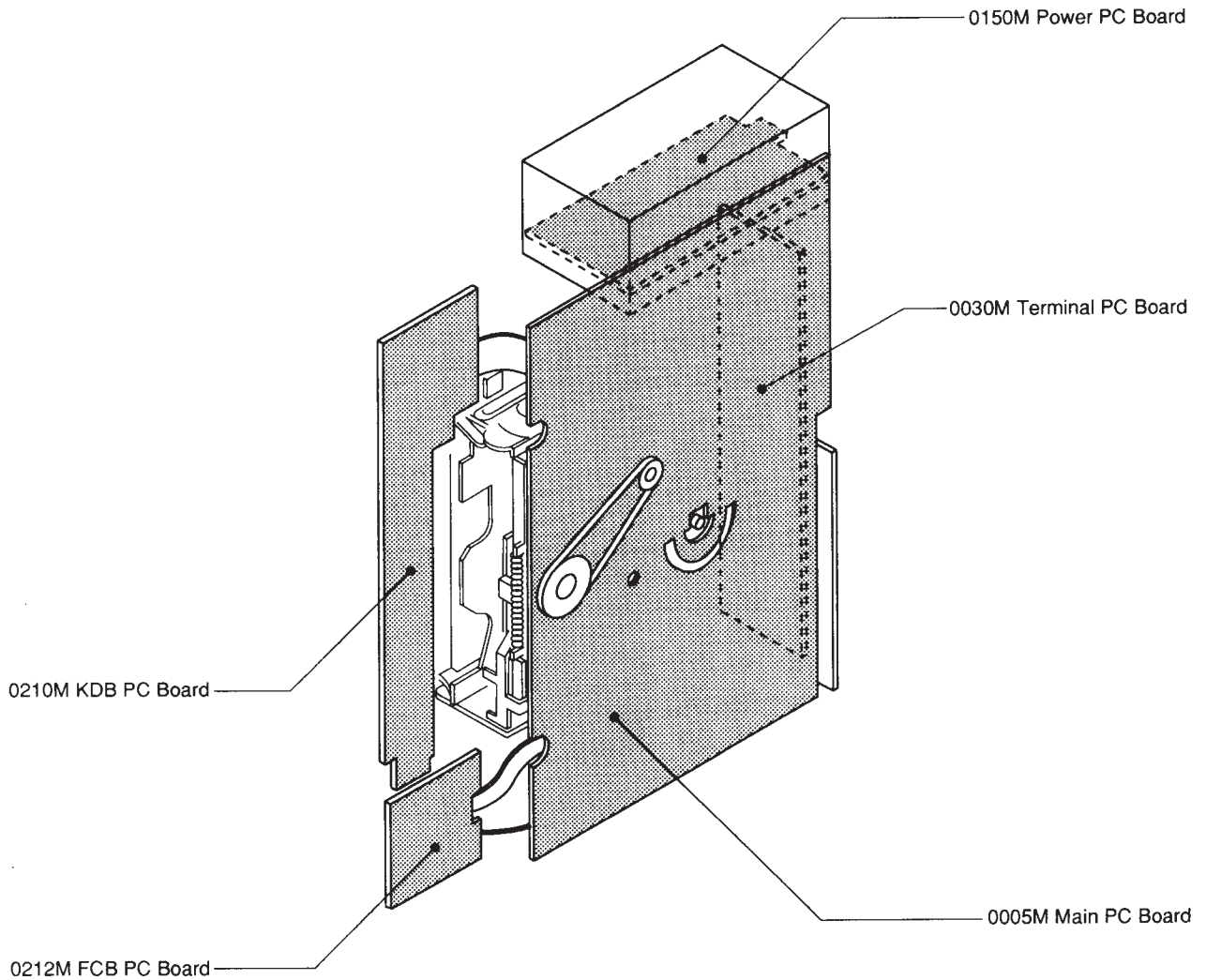
## 4. STANDING PC BOARDS FOR SERVICING

After removing the mechanical deck with the main PC board, place the mechanical deck to upright. Then perform servicing in the condition that all the units are connected each other.

### Note:

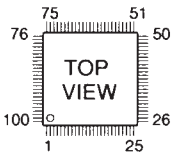
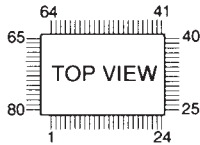
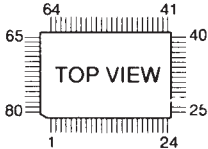
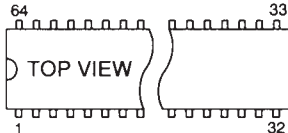
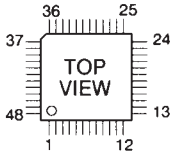

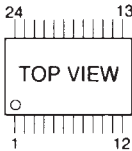
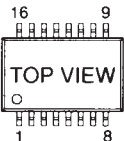

Applying an excessive force to the connector connecting KDB and FCB PC board will damage the connector.

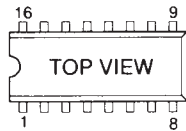
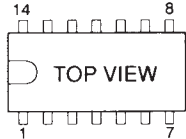
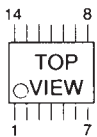
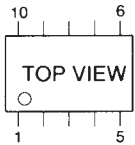
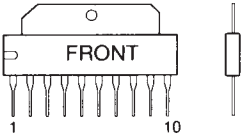
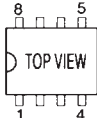
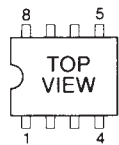
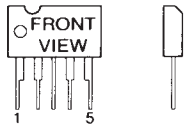

So, take much care when removing them.




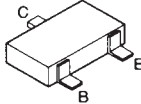

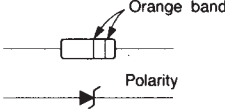
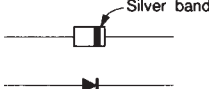




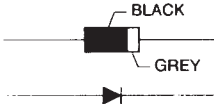
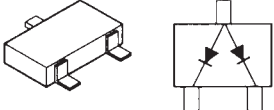


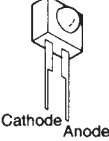
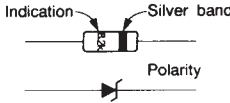
## 5. PART CONFIGURATION AND THEIR SYMBOLS

1.ICs

NAME	SHAPE
TMP90CR74DF-7504	
TMP87CK70AF-6311	
TA8863AF	
MSP3410	
LA7447M	
STV6400	
LC89970M	
MC14094BD	
74HC4053	

NAME	SHAPE
TB6515AP	
U4614B	
BA3129F	
LA7356M	
TA7291S	
ST24C04 LM393N BA7046	
TA75557P	
BA7755	
PST7032MT	

NAME	SHAPE
2. TRANSISTORS	
PT493F	
2SA1020-Y 2SC2236-Y(C)	
BC337	
BC848,RN1404 BC858,RN1405 BC858,RN2403 BC847B,BC848B RN2402,2SA1162-Y RN1402	
3. DIODES	
1N4148 1N4448 1N4148 ZPD10V 1N4007	
ZPD5.6	
FUF5405 BA157 MUR115 BA158 MUR115	

NAME	SHAPE
ZP5.1 1N4001 BAV20 ZPD8.2 ZPD2.7	
BAV20	
1N5822 BA157	
1SS181	
LL4448 LL4148	
ZMM5.6 ZMM5.1	
GL451V	
ZPD12	

## 5-1. Replacing Subminiature "CHIP" Parts

### 5-1-1. Required Tools:

1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
2. Tweezers.
3. Blower type hair dryer.

### 5-1-2. Soldering Cautions:

1. Do not apply heat for more than 3s.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

### 5-1-3. Removal (Resistors, Capacitors, etc.):

1. Melt the solder at one side.

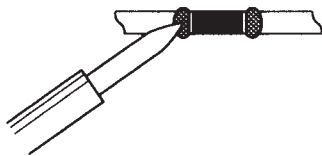


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

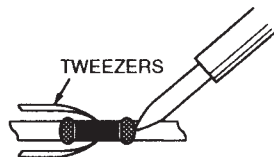


Fig. 2

3. Remove the part with a twisting motion.

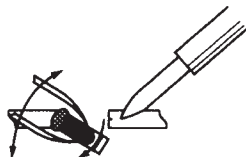


Fig. 3

### 5-1-4. Removal (Transistors, Diodes, etc.):

1. Melt the solder of one lead.

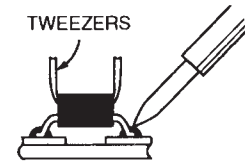


Fig. 4

2. Lift the side of that lead upward.

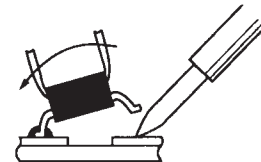


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

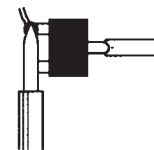


Fig. 6

### 5-1-5. Preheating (Except for semiconductors):

Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two min. at approximately 150°C.

### 5-1-6. Replacement:

1. Presolder the contact points of the circuit pattern.

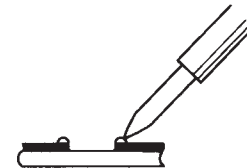


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

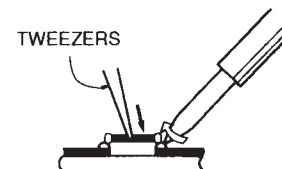


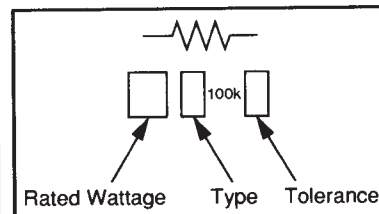
Fig. 8

## 5-2. Precautions for Part Replacement






- In the schematic diagram, parts marked  $\Delta$  (ex.  $\Delta$  F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire etc.

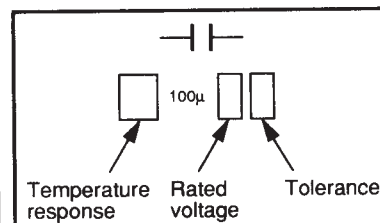
### 5-3. Solid Resistor Indication

<b>Unit</b>	None ..... $\Omega$ k ..... $k\Omega$ M ..... $M\Omega$
<b>Tolerance</b>	None ..... $\pm 5\%$ B ..... $\pm 0.1\%$ C ..... $\pm 0.25\%$ D ..... $\pm 0.5\%$ E ..... $\pm 1\%$ G ..... $\pm 2\%$ K ..... $\pm 10\%$ M ..... $\pm 20\%$
<b>Rated Wattage</b>	(1) Chip Parts None ..... 1/16W (2) Other Parts None ..... 1/6W Other than above, described in the Circuit Diagram.
<b>Type</b>	None ..... Carbon film S ..... Solid R ..... Oxide metal film W ..... Metal film W ..... Cement FR ..... Fusible



#### 5-4. Capacitance Indication

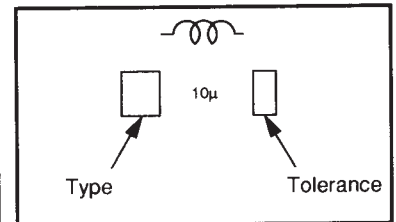
<b>Symbol</b>	 ..... Electrolytic, Special electrolytic  ..... Non polarity electrolytic  ..... Ceramic, plastic  ..... Film  ..... Trimmer
<b>Unit</b>	None ..... F $\mu$ ..... $\mu$ F p ..... pF
<b>Rated voltage</b>	None ..... 50V For other than 50V and electrolytic capacitors, described in the Circuit Diagram.
<b>Tolerance</b>	(1) Ceramic, plastic, and film capacitors of which capacitance are more than 10 pF. None ..... $\pm 5\%$ or more B ..... $\pm 0.1\%$ C ..... $\pm 0.25\%$ D ..... $\pm 0.5\%$ F ..... $\pm 1\%$ G ..... $\pm 2\%$ (2) Ceramic, plastic, and film capacitors of which capacitance are 10 pF or less. None ..... more than $\pm 5\%$ pF B ..... $\pm 0.1$ pF C ..... $\pm 0.25$ pF (3) Electrolytic, Trimmer Tolerance is not described.
<b>Temperature characteristic (Ceramic capacitor)</b>	None ..... SL For others, temperature characteristics are described. (For capacitors of $0.01 \mu$ F and no indications are described as F.)





## 5-5. Inductor Indication

Unit	None ..... H μ ..... μH m ..... mH
Tolerance	None ..... ±5% B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% F ..... ±1% G ..... ±2% K ..... ±10% M ..... ±20%
Type	PL ..... Peaking For other, model name is described.



## 5-6. Waveform and Voltage Measurement

- Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers.

Then, repeat steps 1 and 2.

4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 10)

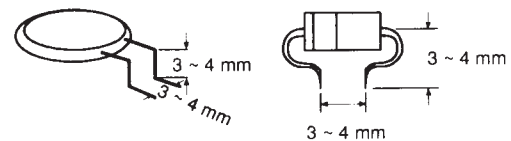


Fig. 10

## 5-7. Chip Part Replacement

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 9)

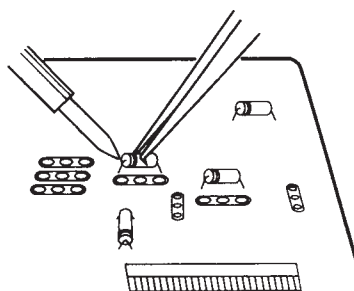


Fig. 9

2. Apply heat to the solder at the other end of the part and remove it.

The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.

5. Mount the replacement part so that it does not touch any other parts. (Fig. 11)

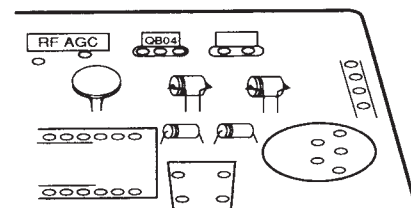
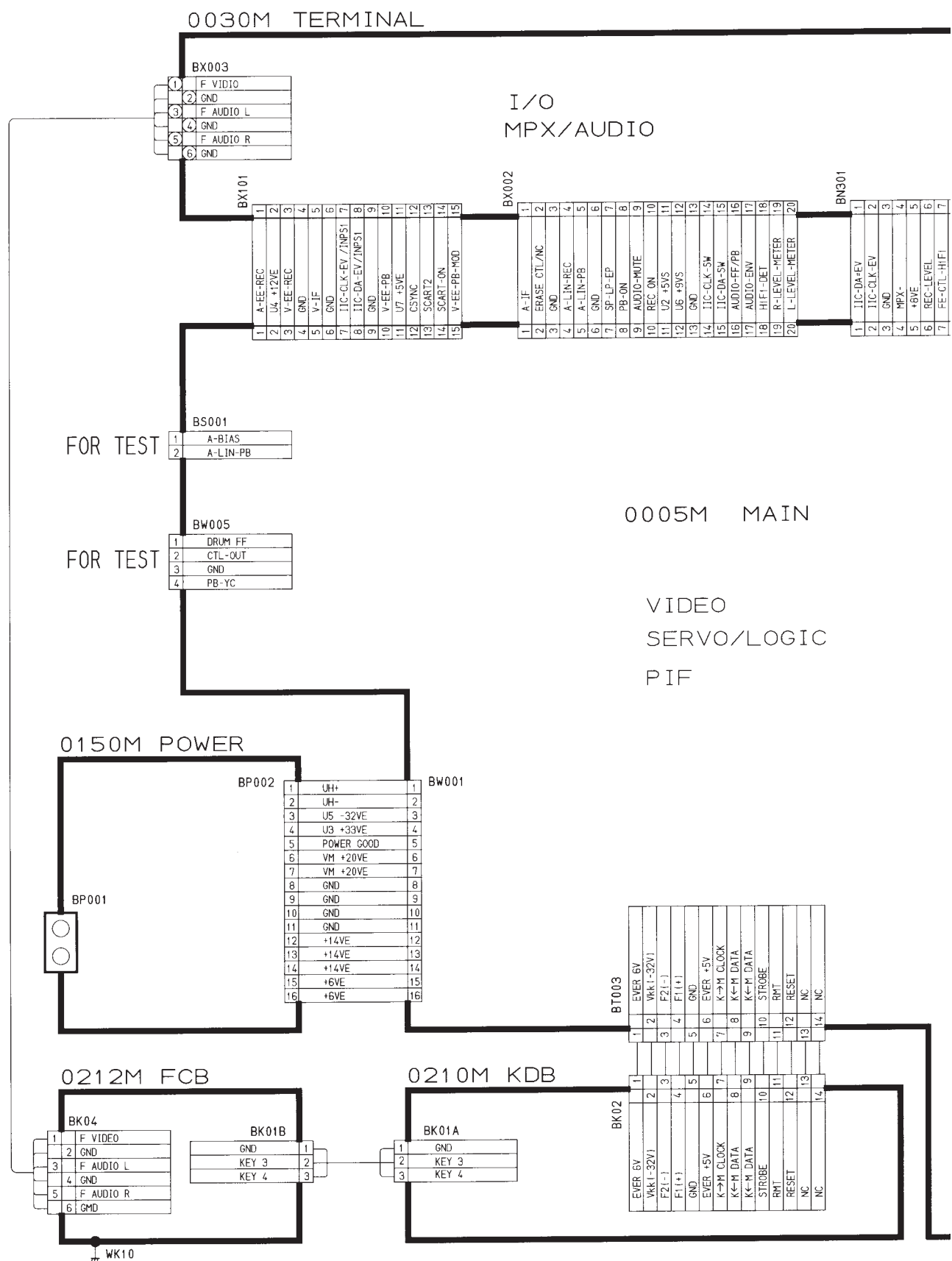
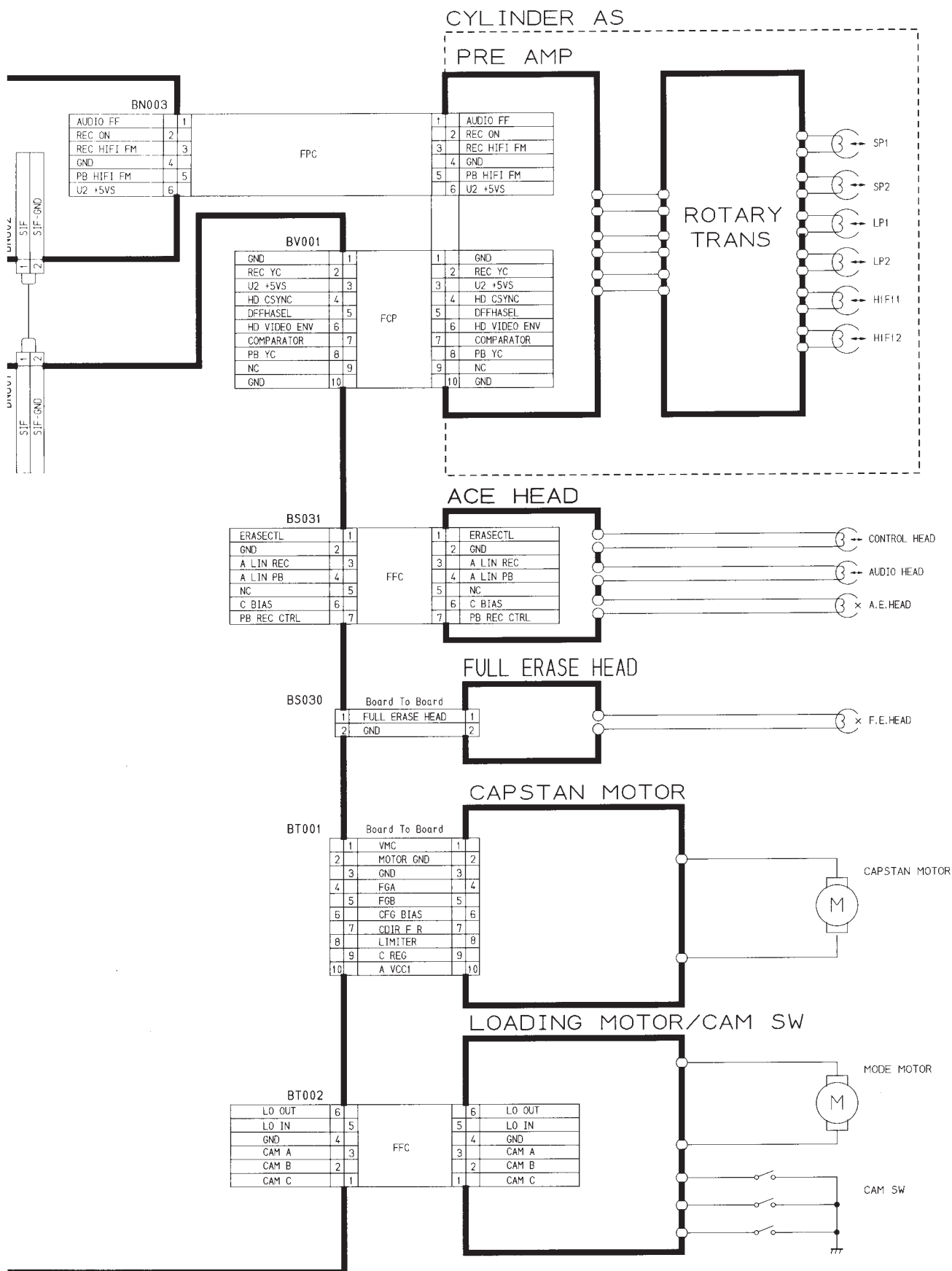


Fig. 11

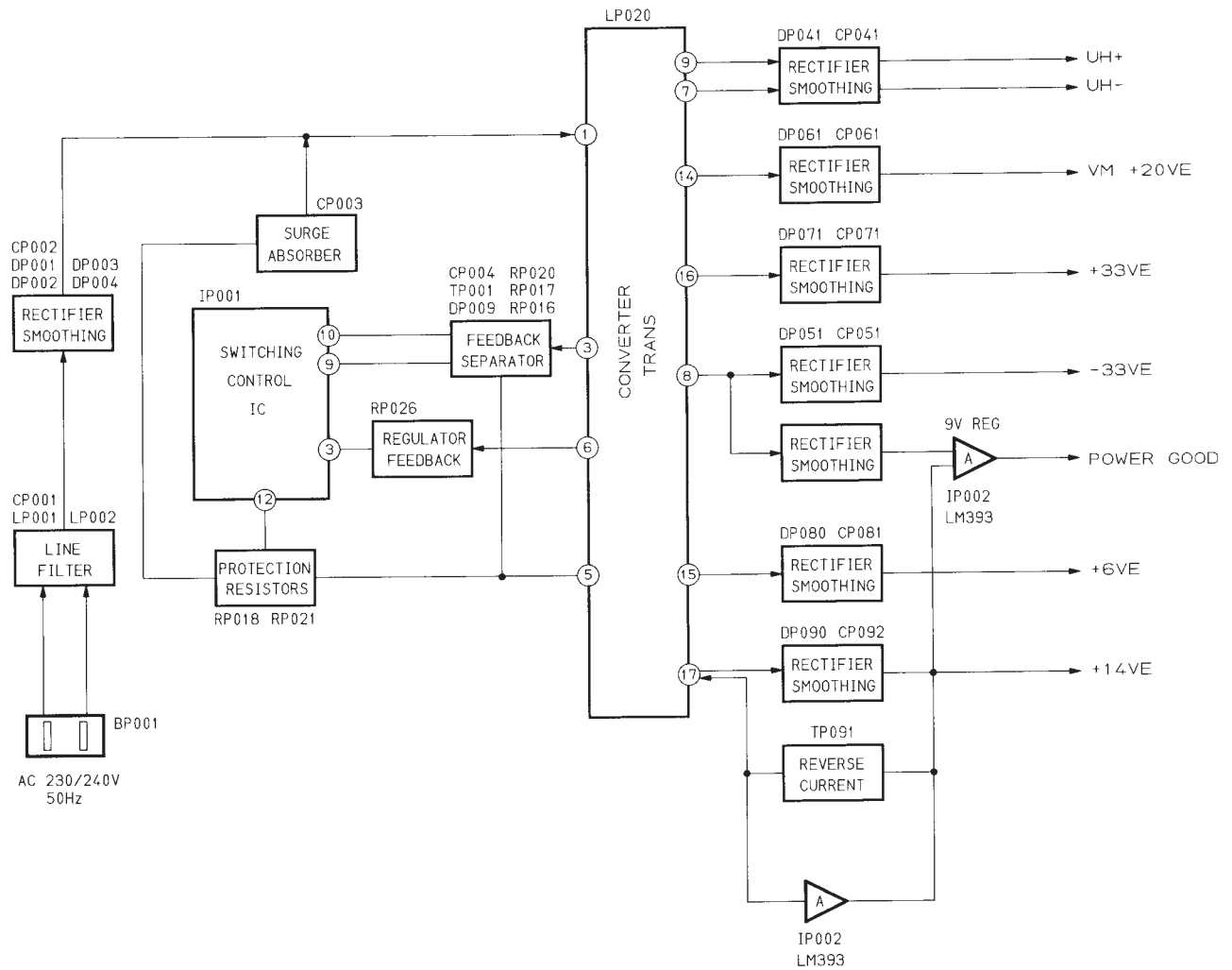
## 6. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM



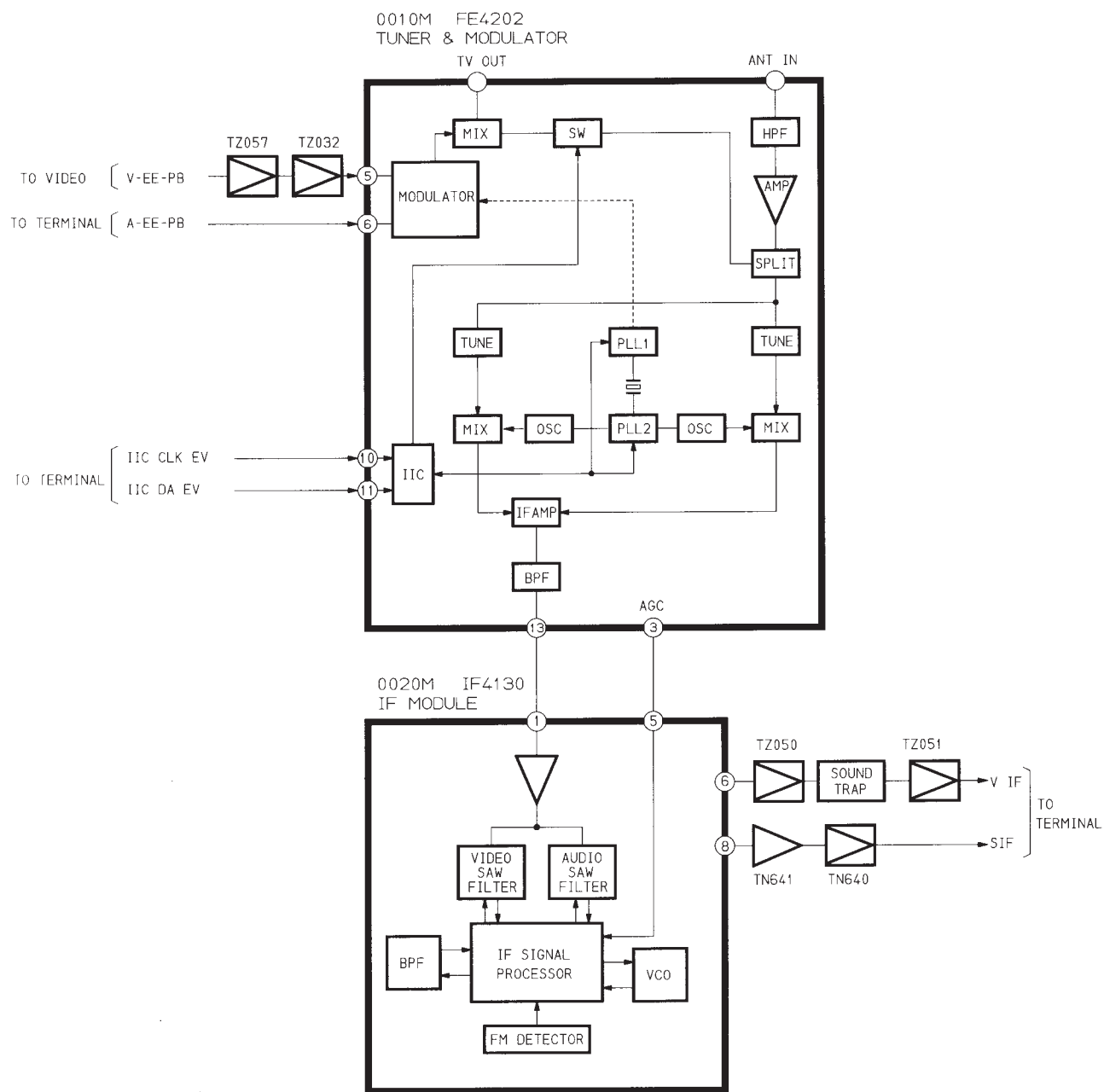


## 7. BLOCK DIAGRAM

### 7-1. POWER BLOCK DIAGRAM

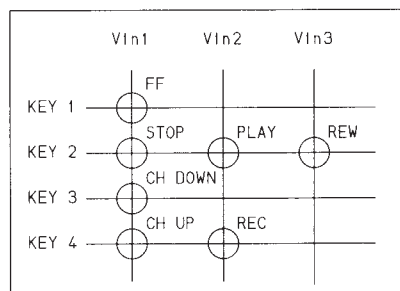
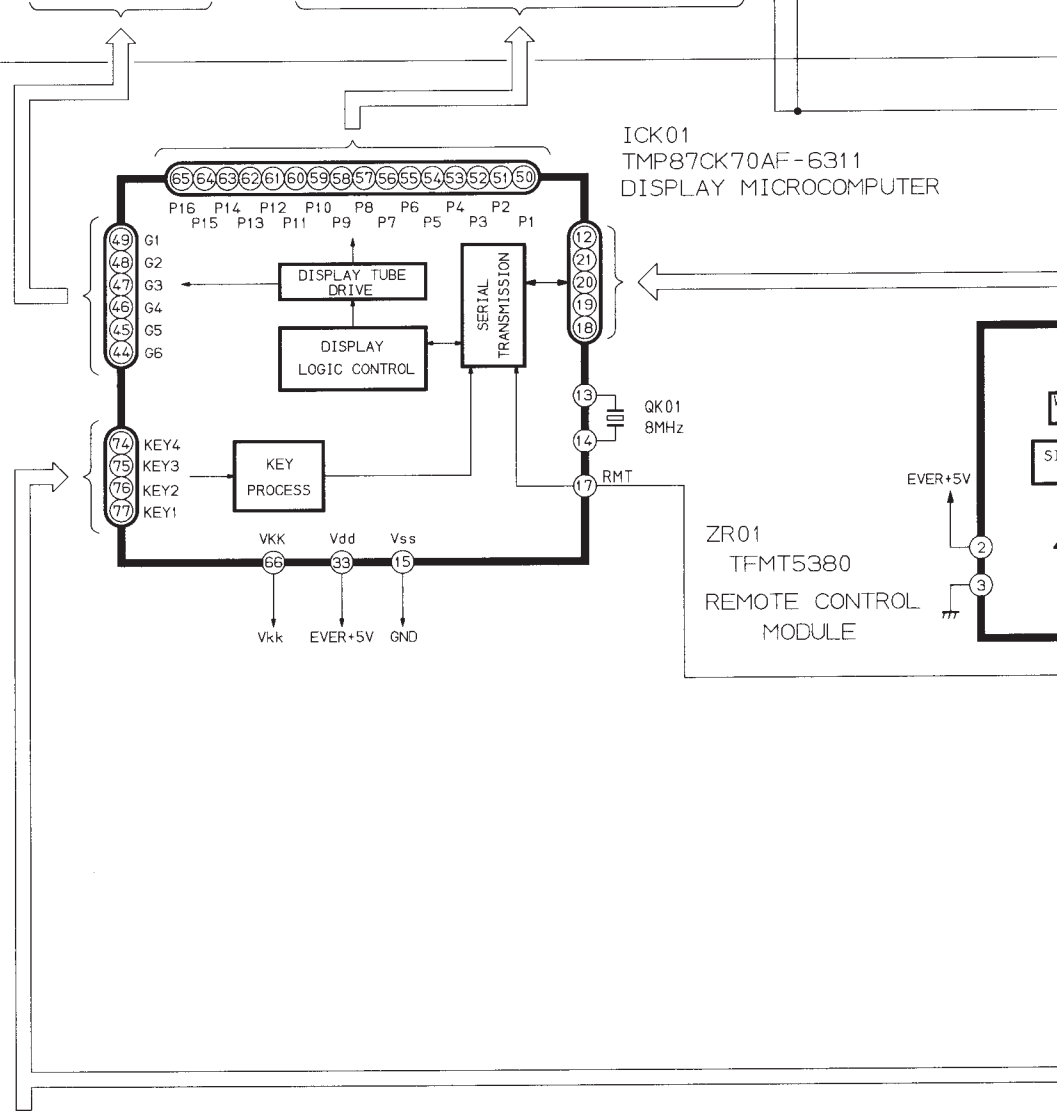
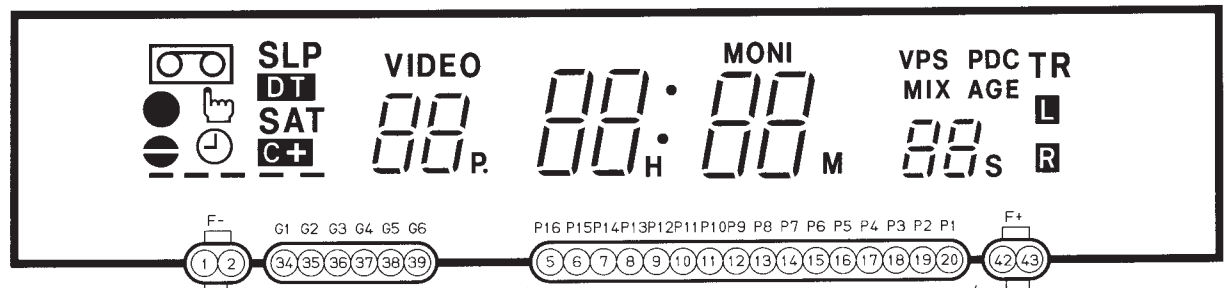


7-2. PIF BLOCK DIAGRAM

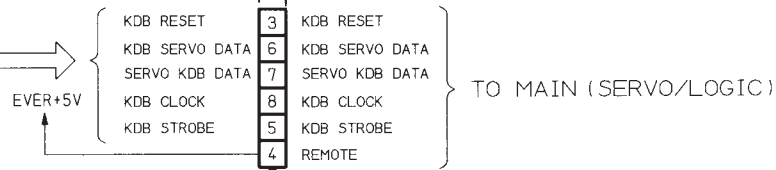
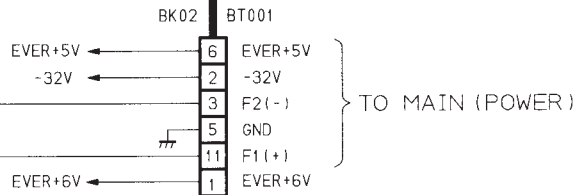


# 7-3. KDB BLOCK DIAGRAM

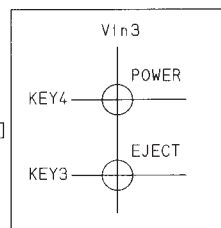
GK01 6-MT-255GK



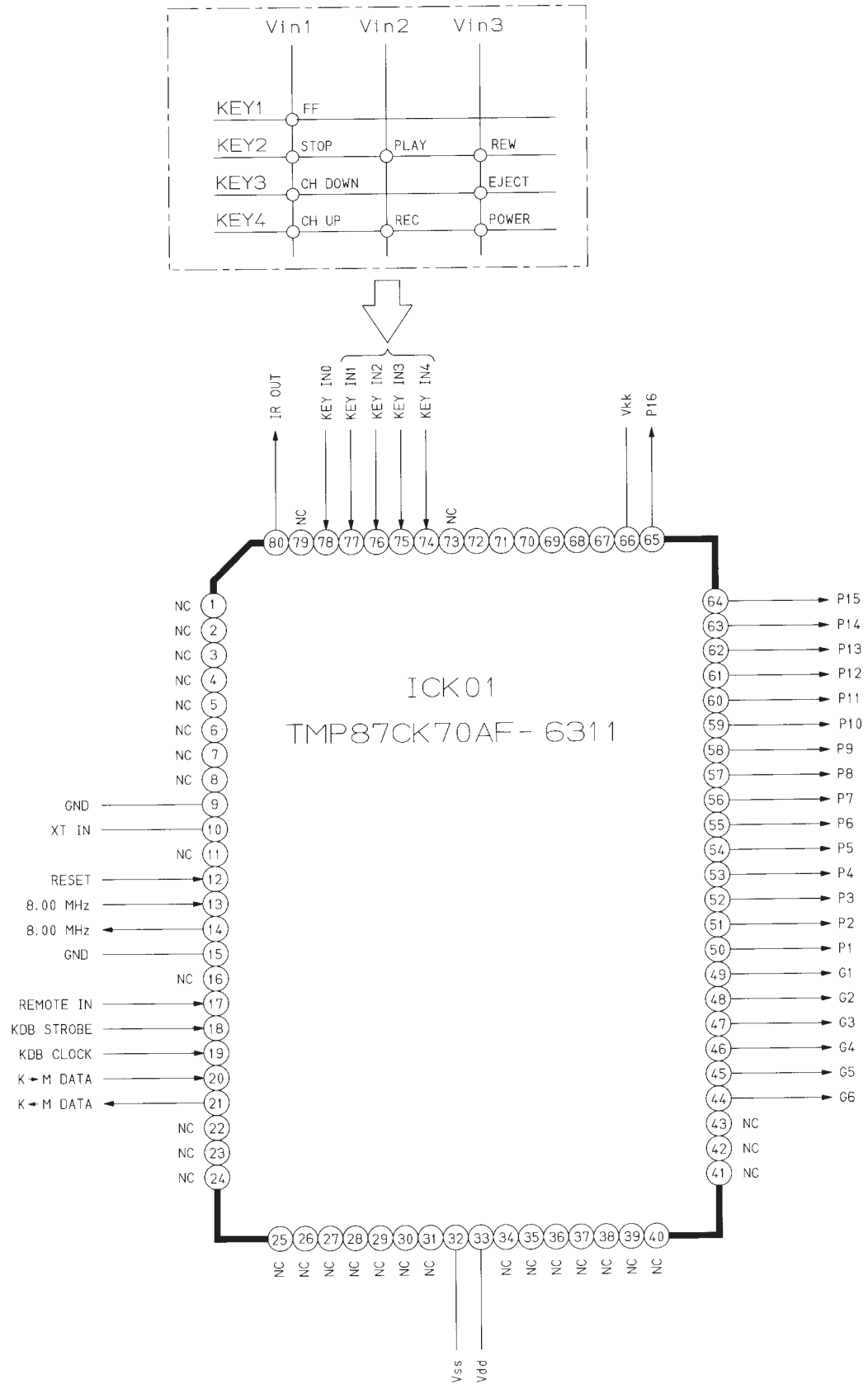


0210M  
KDB0005M  
MAIN0212M  
FCB

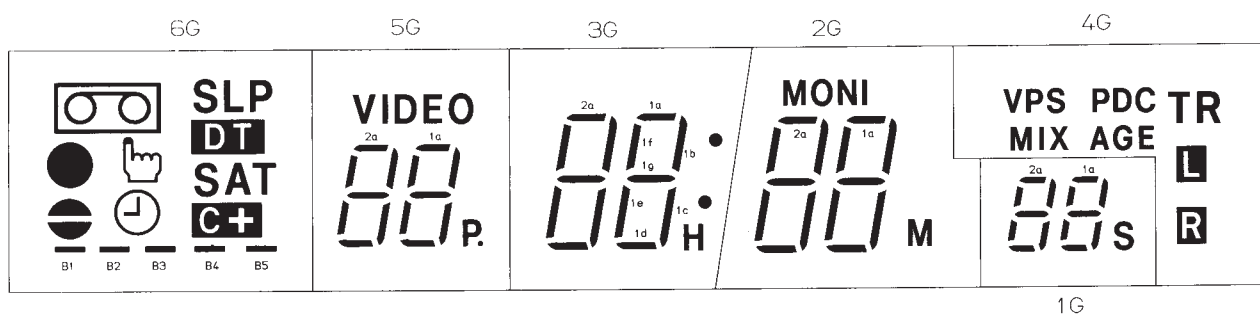
BK01A BK01B



### 7-3-1. KDB MICROCOMPUTER TERMINAL FUNCTION



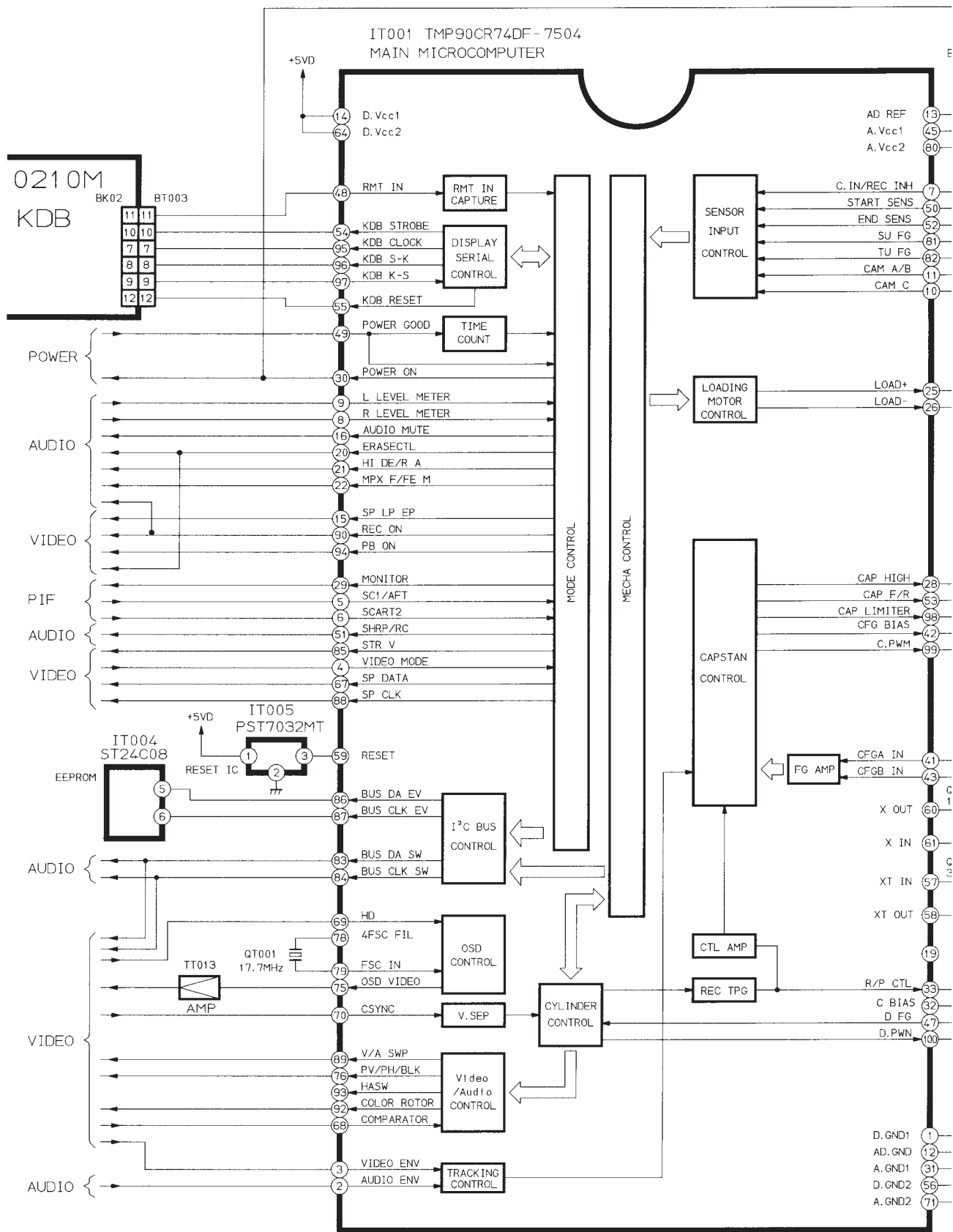
### 7-3-2. KEY DISPLAY GK01 6-MT-255GNK

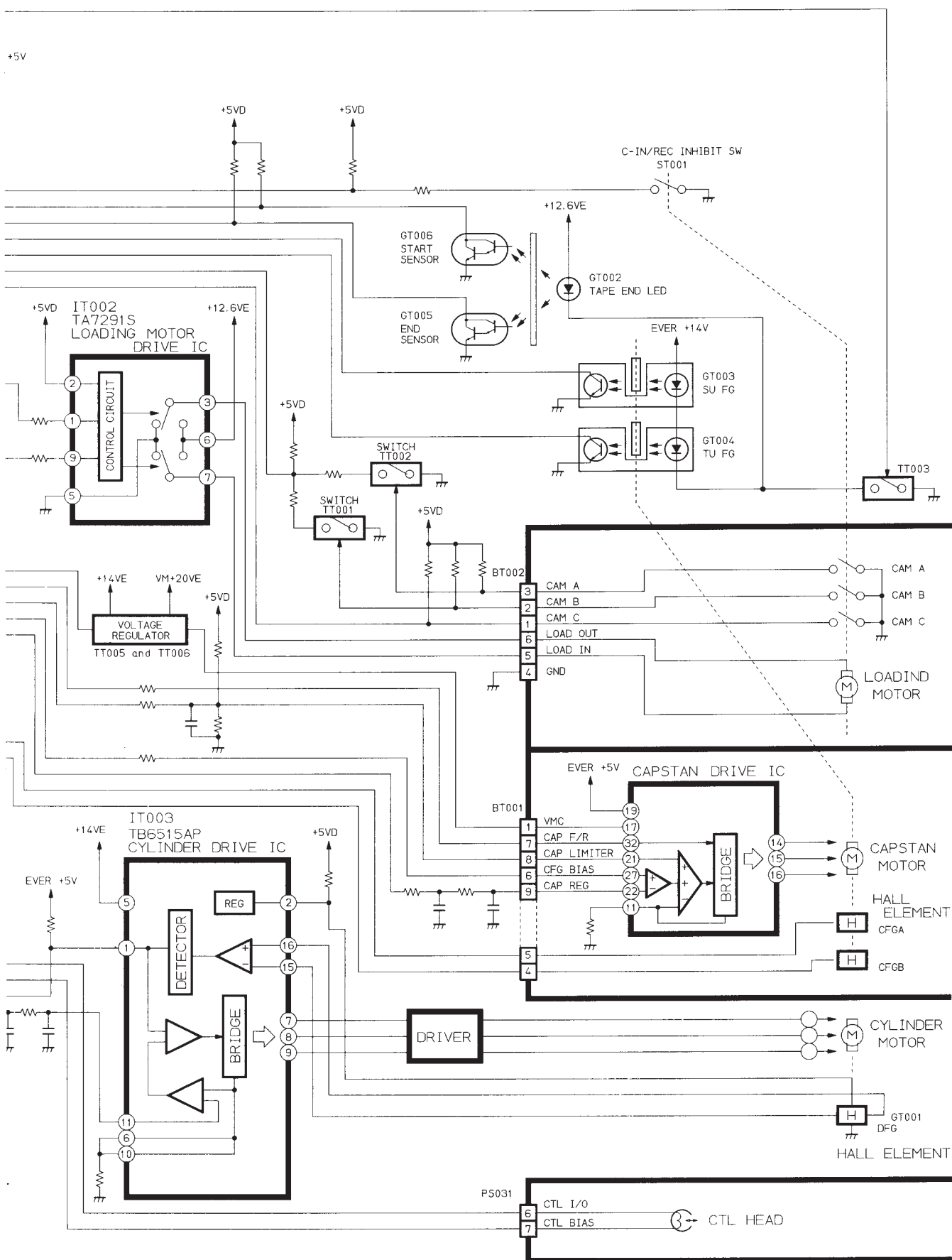


### 7-3-3. DISPLAY PATTTERN

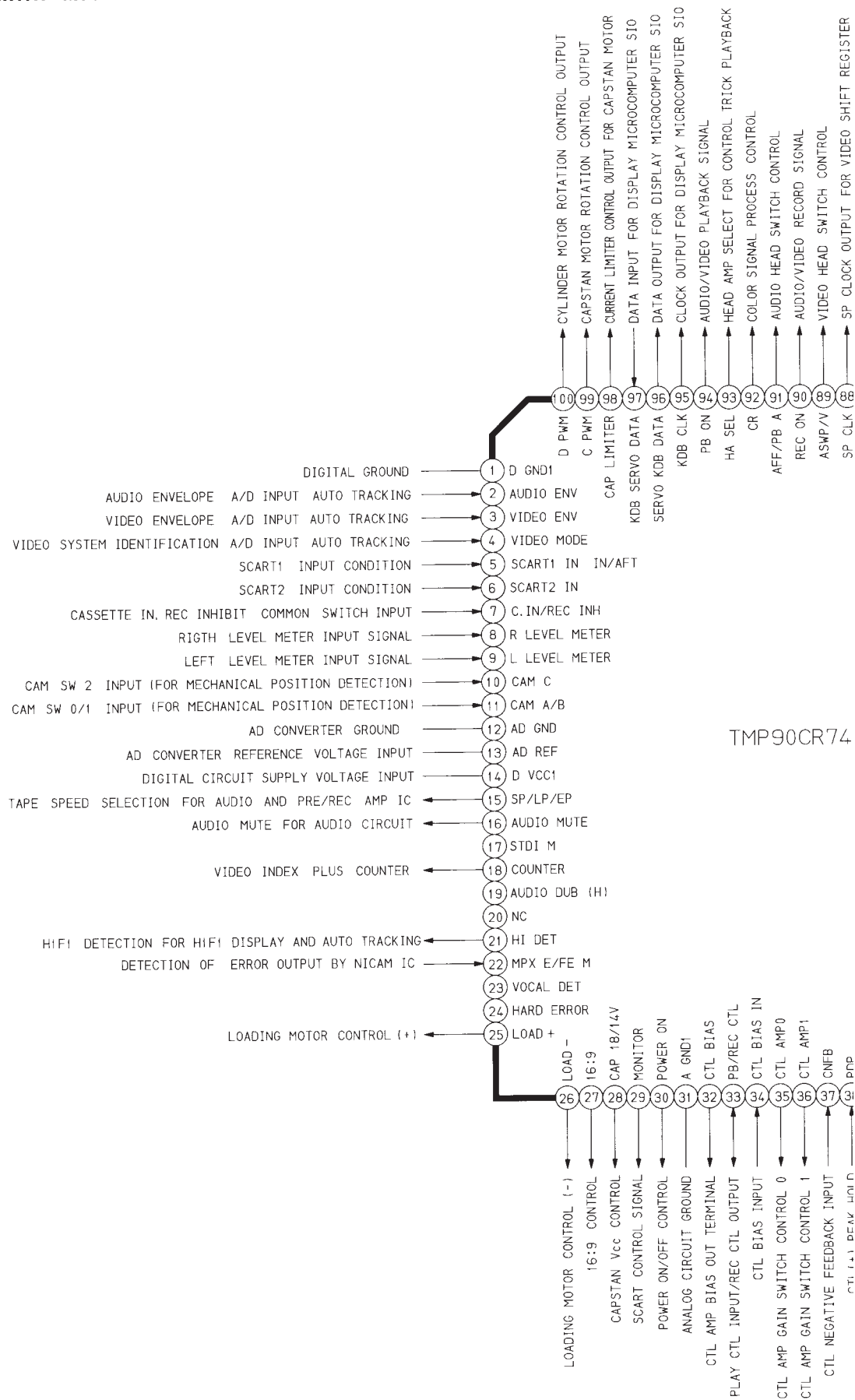
	6G	5G	4G	3G	2G	1G
P1		1d	<b>VPS</b>	1d	1d	1d
P2		1e	<b>MIX</b>	1e	1e	1e
P3		1c	<b>AGE</b>	1c	1c	1c
P4		1g	<b>PDC</b>	1g	1g	1g
P5	<b>P</b>	1f	<b>L</b>	1f	1f	1f
P6	<b>L</b>	1b		1b	1b	1b
P7	<b>S</b>	1a	<b>R</b>	1a	1a	1a
P8		<b>VIDEO</b>	<b>TR</b>	<b>H</b>	<b>M</b>	<b>S</b>
P9	B5	2d		2d	2d	2d
P10	B4	2e		2e	2e	2e
P11	B3	2c		2c	2c	2c
P12	B2	2g		2g	2g	2g
P13	B1	2f		2f	2f	2f
P14	<b>C+</b>	2b		2b	2b	2b
P15	<b>SAT</b>	2a		2a	2a	2a
P16	<b>DT</b>	<b>P.</b>		col.	<b>MONI</b>	

## 7-4. SERVO/LOGIC BLOCK DIAGRAM

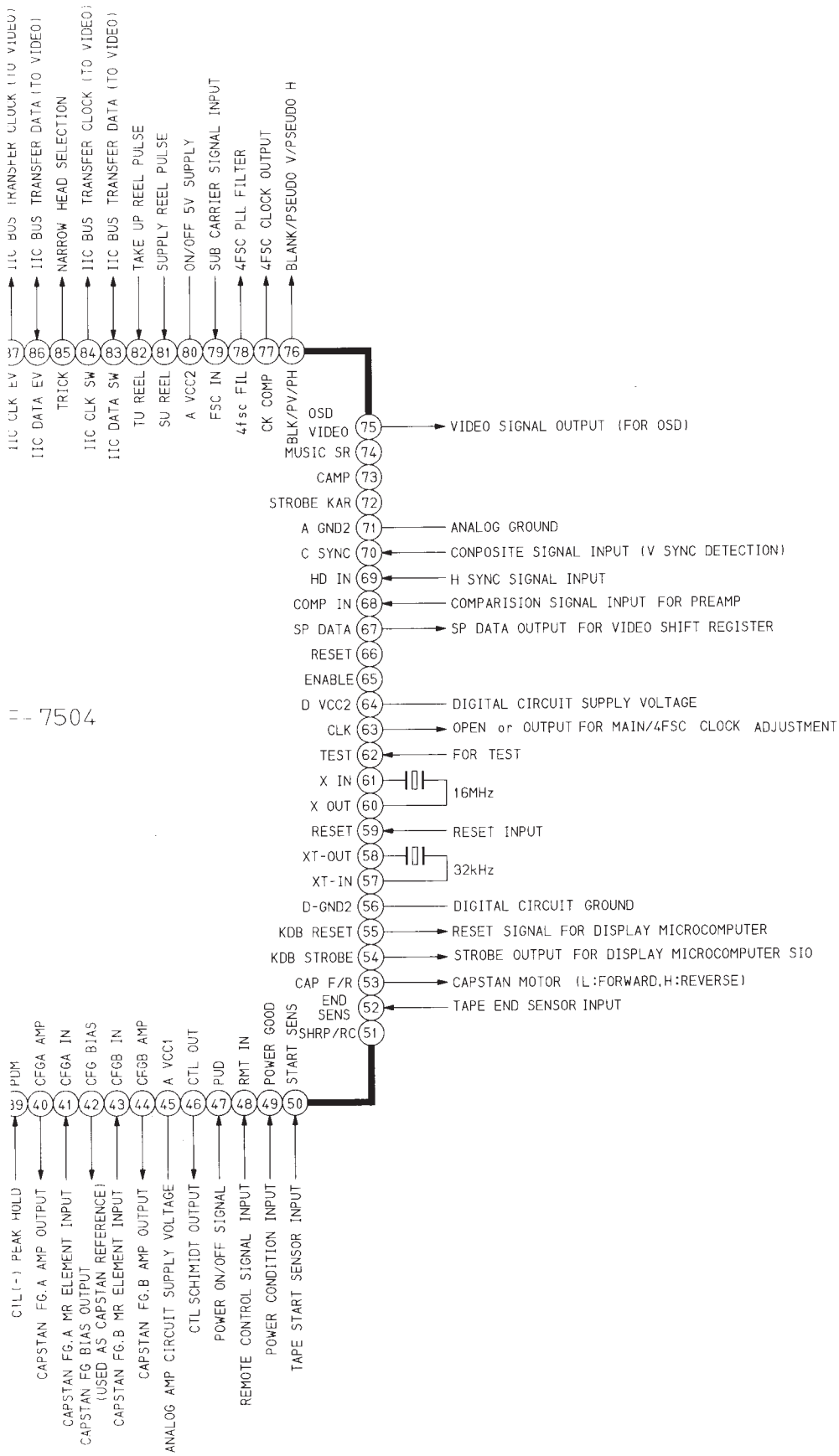




# 7-4-1. IT001 MAIN MICROCOMPUTER TERMINAL FUNCTION











































































































































































TMP90CR74








7504



## 7-4-2. IT001 Main Microcomputer Output Polarity

Pin No.	MODE Pin Name	ACTIVE	SLOT IN	SLOT OUT	Loading	Unloading	STOP	STAND -BY	FF	REW	PLAY SP SLP	Double Speed PLAY	CUE
16	A.MUTEI	H	L	L	L	L	L	L	L	L	L	L	H
25	LOAD+	L	L	H	L	H	H	H	H	H	H	H	H
26	LOAD-	L	H	L	H	L	H	H	H	H	H	H	H
30	POWER ON	L	L	L	L	L	L	L	L	L	L	L	L
33	R/P CTL		-	-	-	-	-	-	-	-	-	-	-
46	CTL OUT		L	L	L	L	L	L					
53	CAP F/R	-	L	H	L	H	H	H	L	H	L	L	L
54	KDB STB												
67	SP DATA												
76	PV/PH/BLK	4ST	4ST								4ST		
83	I2C DATA1												
84	I2C CLOCK1												
85	TRICK	H	L	L	L	L	L	L	L	L	L	H	H
86	I2C DATA2												
87	I2C CLOCK2												
88	SP CLK												
89	DFF												
92	CR												
93	HASW		L	L	L	L	L	L	-	-	L H		
95	KDB CLK												
96	DATA M→KDB												
98	CAP LIMITER	PWM	L	L	PWM		L	PWM					
99	CPWN	PWM	PWM	PWM	PWM		L	L	PWM				
100	DPWN	PWM	L	L	PWM		L	PWM					

## 7-4-3. Logic Mode Shift Table

STILL	SLOW	REC SP SLP	REC PAUSE SP SLP	POWER OFF	INITIAL
H	H	L	L	H	H
H	H	H	H	H	H
H	H	H	H	H	H
L	L	L	L	H	H
-	-		-	-	OPEN
L			L	L	L
L		L	L	H	L
←	←	←	←	←	L
←	←	←	←	←	L
←	←	←	←	L	4ST
←	←	←	←	←	H
←	←	←	←	←	H
H	H	L	L	L	L
←	←	←	←	←	H
←	←	←	←	←	H
←	←	←	←	←	L
←	←	←	←	OPEN	OPEN
←	←	←	←	L	L
←	←	L H	L 	L	L
←	←	←	←	←	L
←	←	←	←	←	L
L	PWM	←	←	L	500mA
L	PWM	←	L	L	L
←	←	←	←	L	L

MODE \ KEY	POWER	STOP	PLAY	FF
STOP	OFF	—	○	○
FF	OFF	○	○	CUE
REW	OFF	○	○	○
PLAY	OFF	○	Double Speed Play	CUE
SLOW	OFF	○	○	CUE
STILL	OFF	○	Frame adv	CUE
CUE	OFF	○	○	* 1
REVIEW	OFF	○	○	CUE
ACC. CUE	OFF	○	○	* 2
ACC. REV	OFF	○	○	CUE
REC	OFF	○	×	×
REC PAUSE	OFF	○	×	×
VISS MARK	OFF	○	×	×
POWER OFF	ON	×	×	×
Timer-Standby	ON	×	×	×
Timer-REC	ON	×	×	×

×: No Shift (Current mode)

\* 1 : If pressed within 1s, FF. If not, all CUE

\* 2 : If pressed by Remote Control Unit, FF.

\* 3 : If pressed within 1s, REW. If not, all REVIEW

\* 4 : If pressed by Remote Control Unit, REW.

\* 5 : For index rewrite only.

ole

STOP	PLAY	FF	REW	SLOW	PAUSE	REC	EJECT	Remain Count/ Time	INDEX	Counter RESET	T. Start	T. End
—	○	○	○	×	×	○	EJECT	○	SEARCH	RESET	S. FF	S. REW
○	○	CUE	○	×	×	×	EJECT	○	×	RESET	—	STOP
○	○	○	REVIEW	×	×	×	EJECT	○	×	RESET	STOP	—
○	Double Speed Play	CUE	REVIEW	○	STILL	×	EJECT	○	SEARCH	RESET	—	REWIND
○	○	CUE	REVIEW	○	STILL	×	EJECT	○	×	RESET	—	REWIND
○	Frame adv	CUE	REVIEW	Frame adv	PLAY	REC Pause	EJECT	○	* 5	RESET	—	REWIND
○	○	* 1	REVIEW	×	×	×	EJECT	○	×	RESET	—	REWIND
○	○	CUE	* 3	×	×	×	EJECT	○	×	RESET	STOP	—
○	○	* 2	REVIEW	×	×	×	EJECT	○	×	RESET	—	REWIND
○	○	CUE	* 4	×	×	×	EJECT	○	×	RESET	STOP	—
○	×	×	×	×	REC Pause	—	×	○	V. Mark	RESET	—	REWIND
○	×	×	×	×	REC	×	×	○	×	RESET	—	—
○	×	×	×	×	×	×	×	×	—	RESET	—	REWIND
×	×	×	×	×	×	×	EJECT	×	×	×	—	—
×	×	×	×	×	×	×	×	×	×	×	—	—
×	×	×	×	×	×	×	×	○	V. Mark	RESET	—	Timer Standby

mode)

1s, FF. If not, all CUE

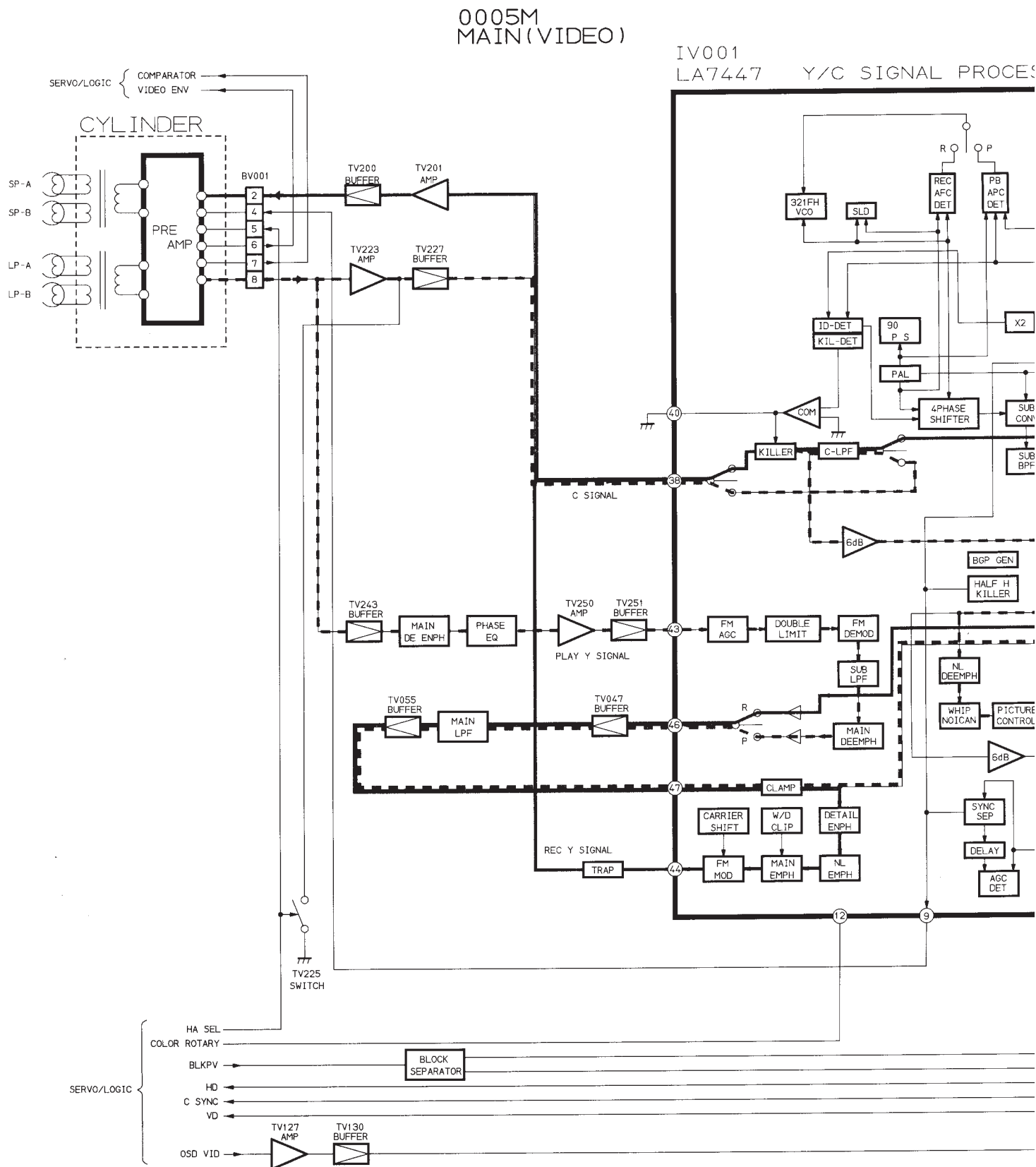
ote Control Unit, FF.

1s, REW. If not, all REVIEW

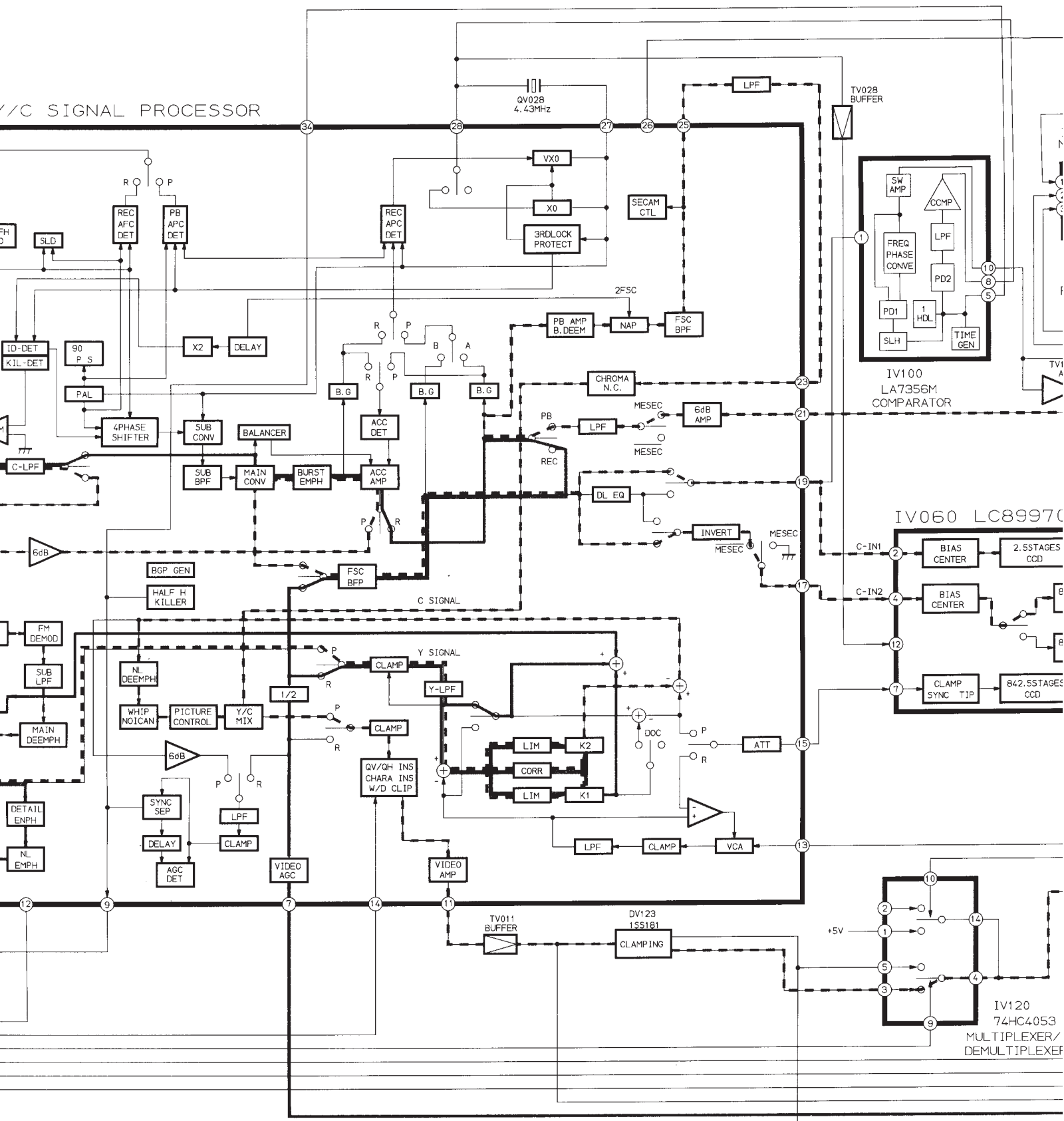
ote Control Unit, REW.

only.

# 7-5. VIDEO BLOCK DIAGRAM



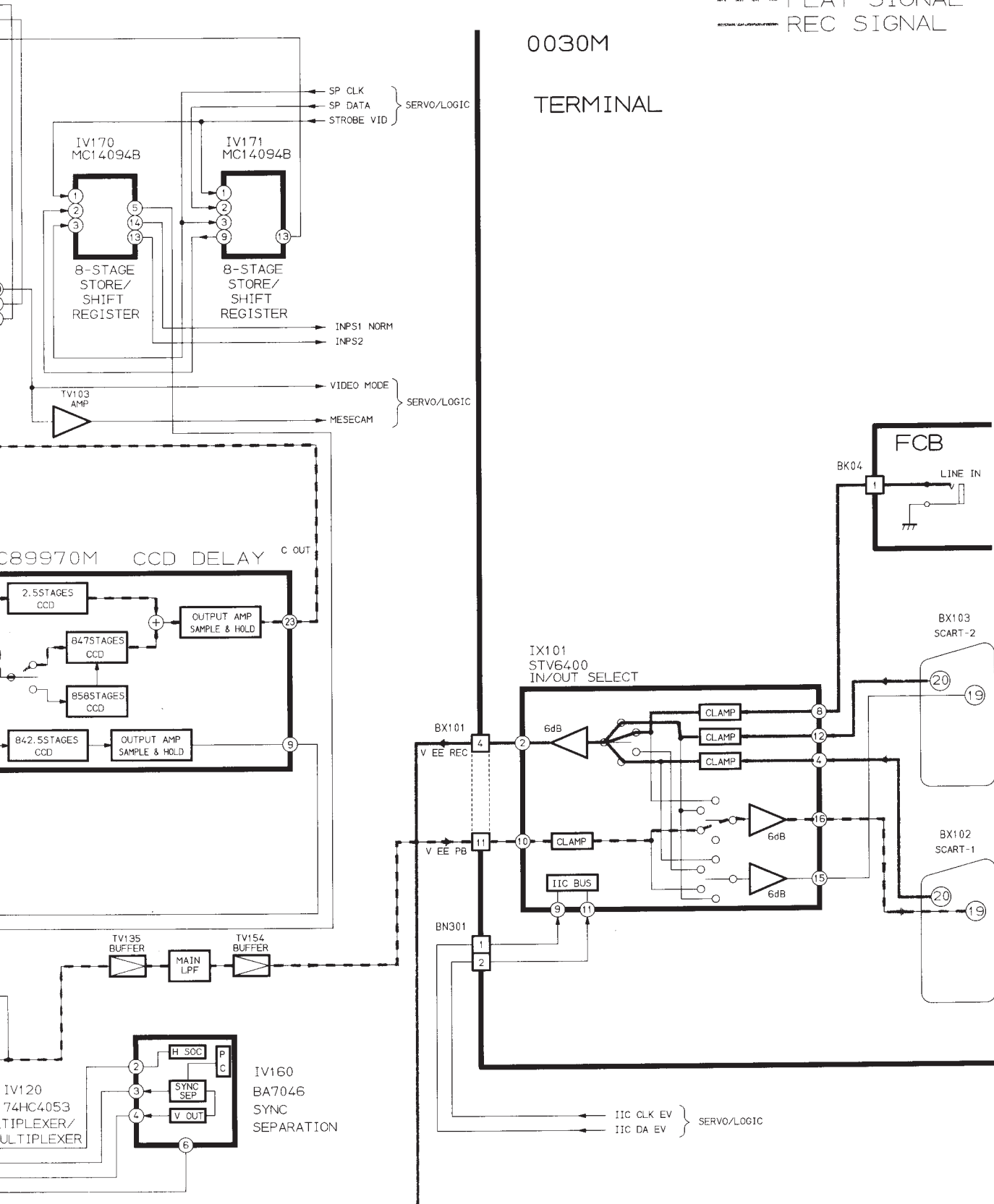
# Y/C SIGNAL PROCESSOR



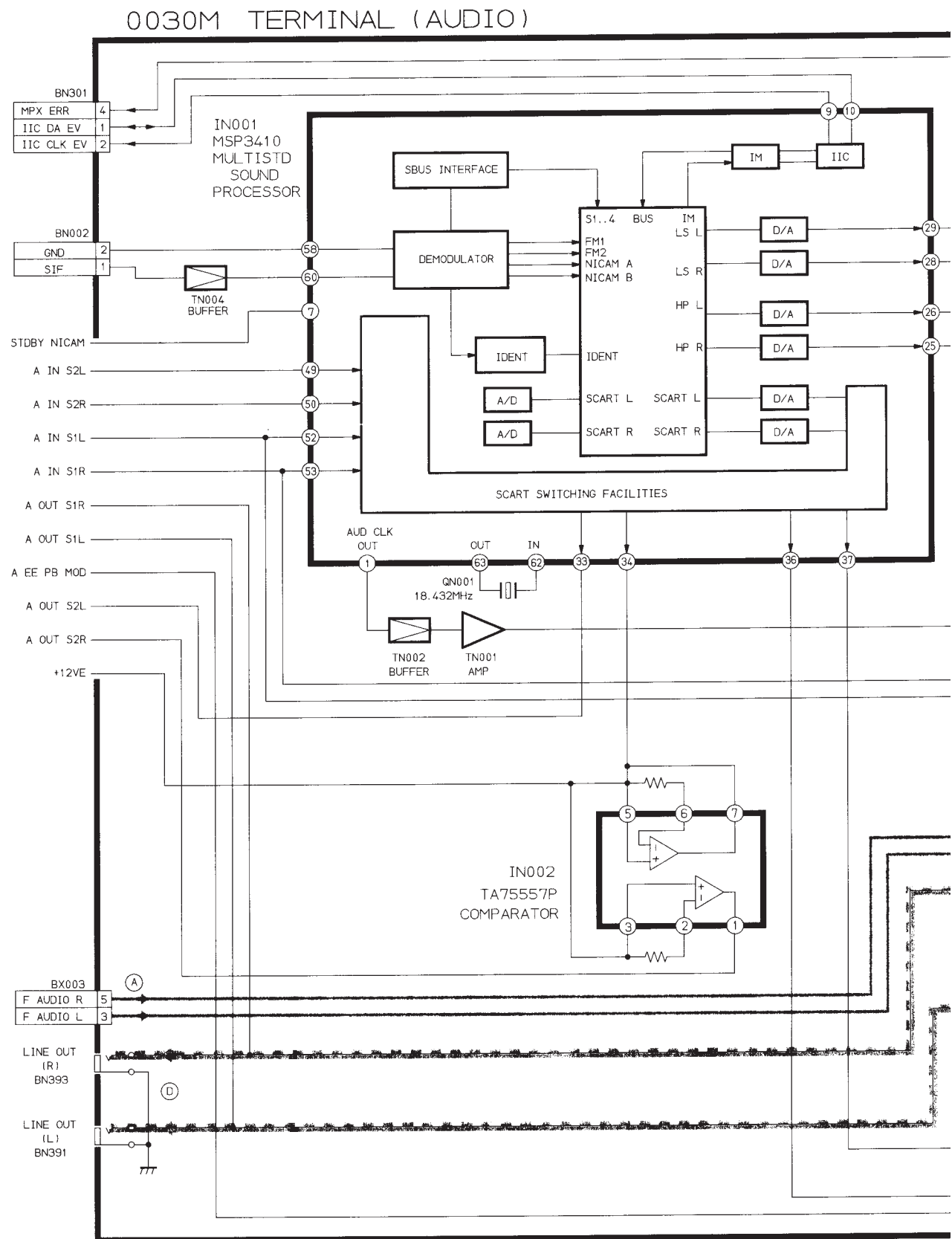
PLAY SIGNAL  
REC SIGNAL

0030M

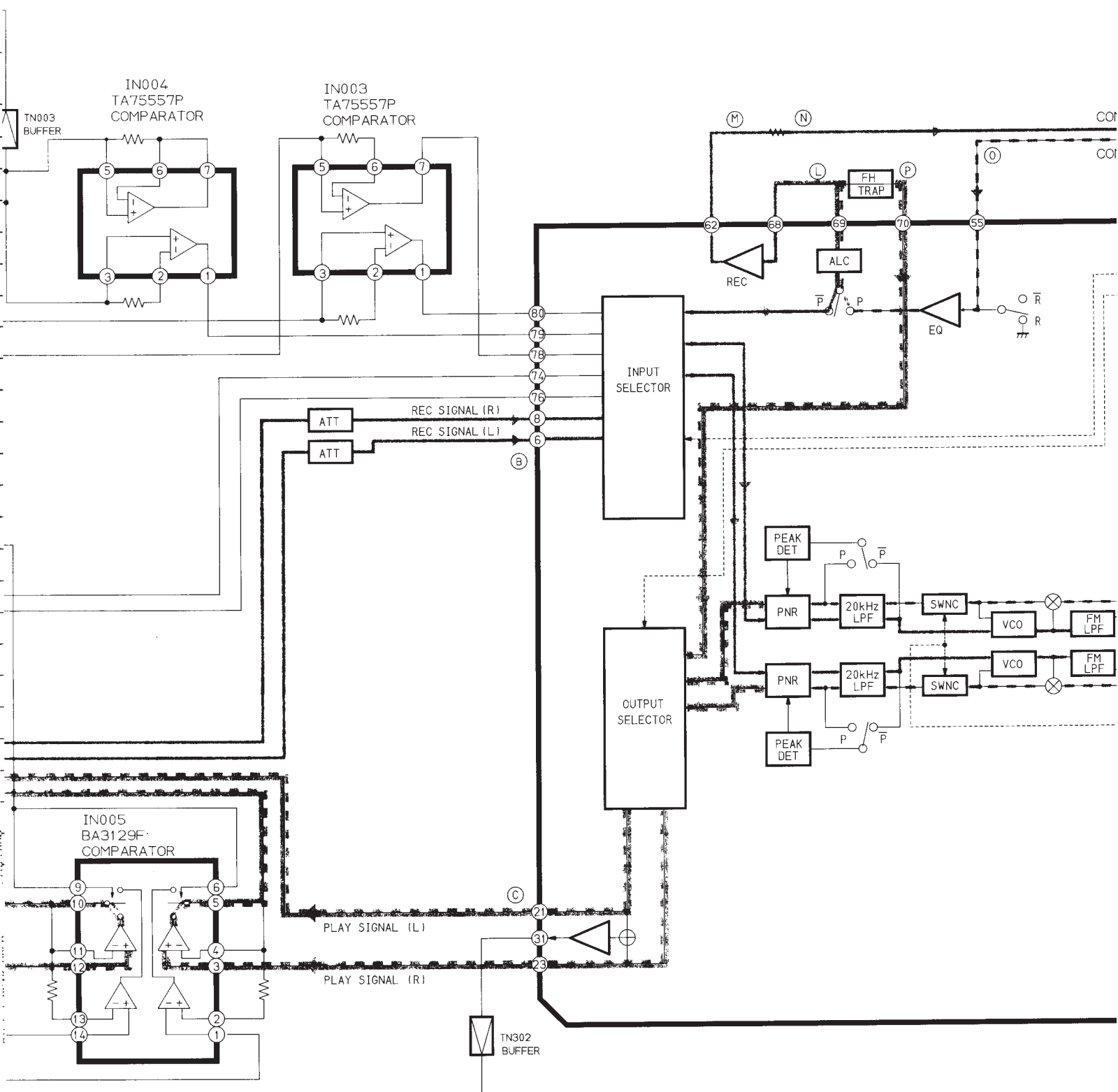
TERMINAL

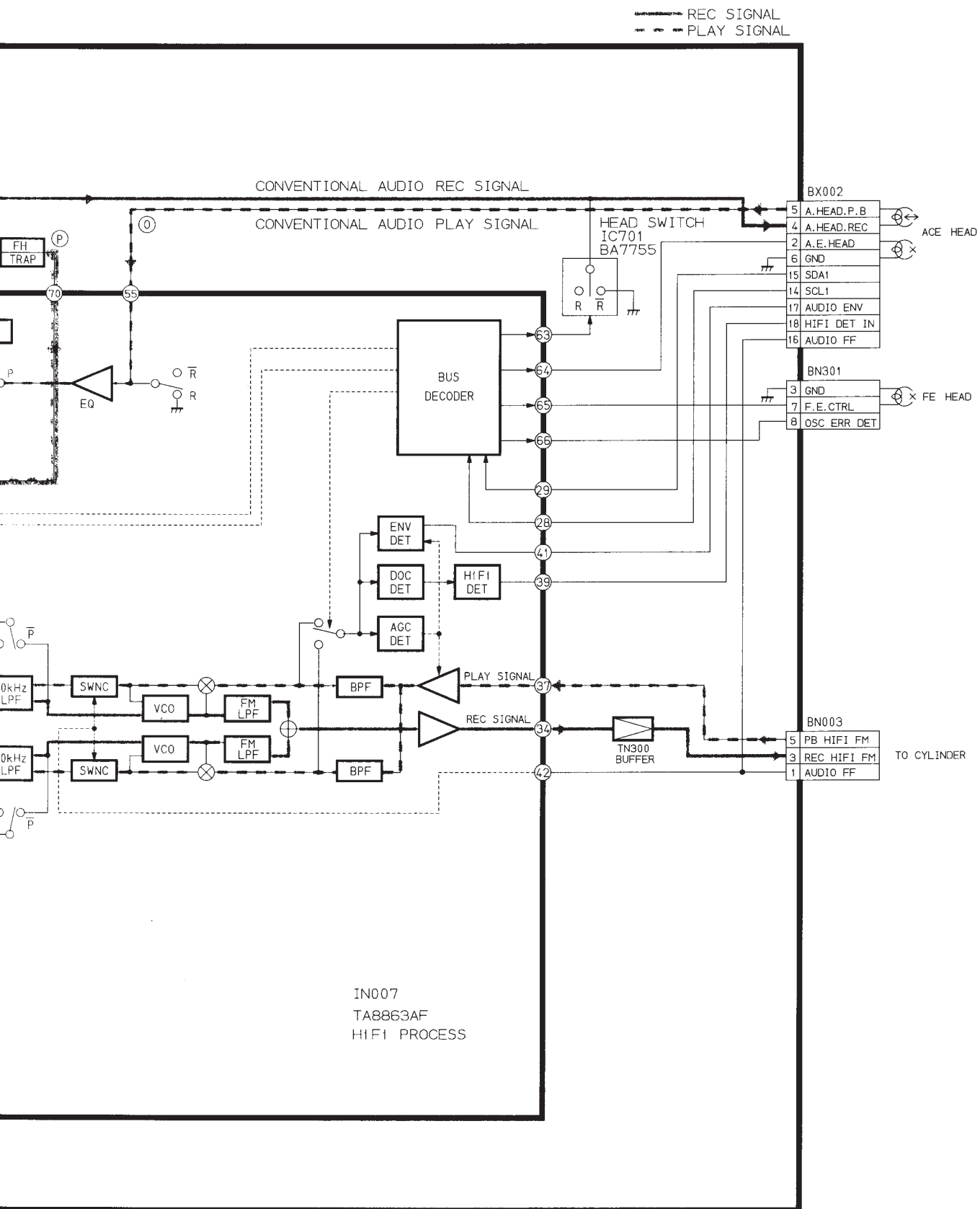


# 7-6. AUDIO BLOCK DIAGRAM

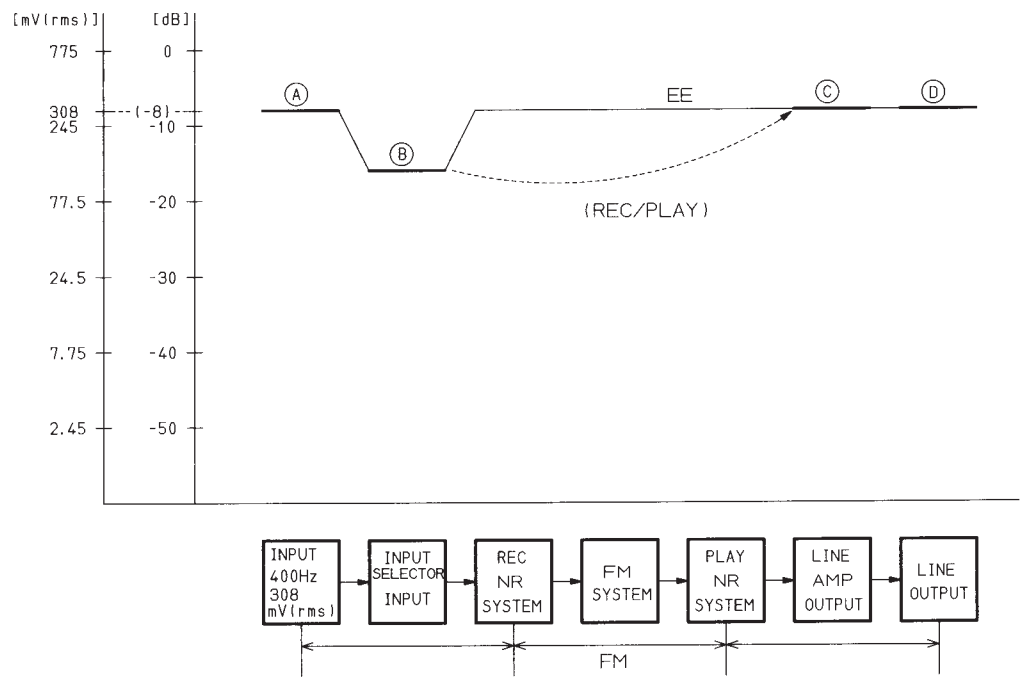




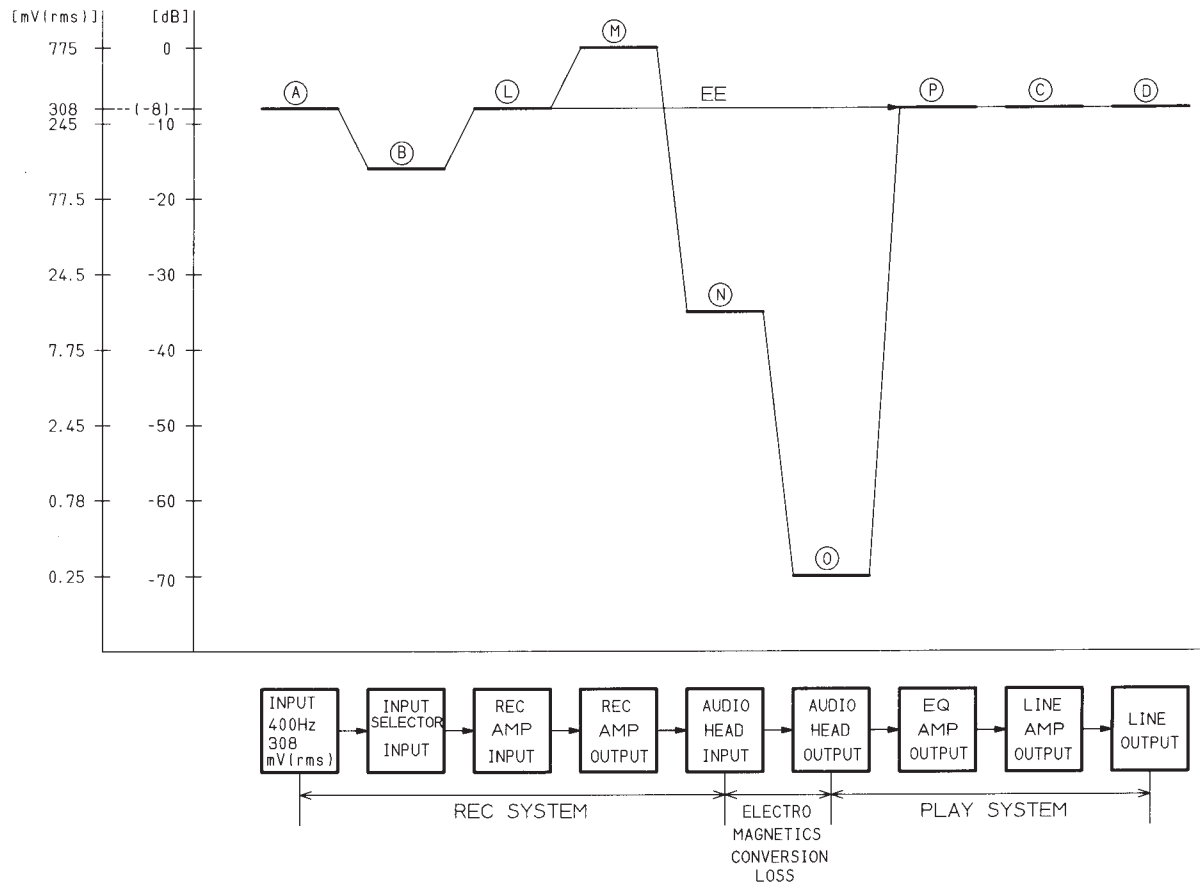




7-6-1. Hi-Fi Audio Level Chart



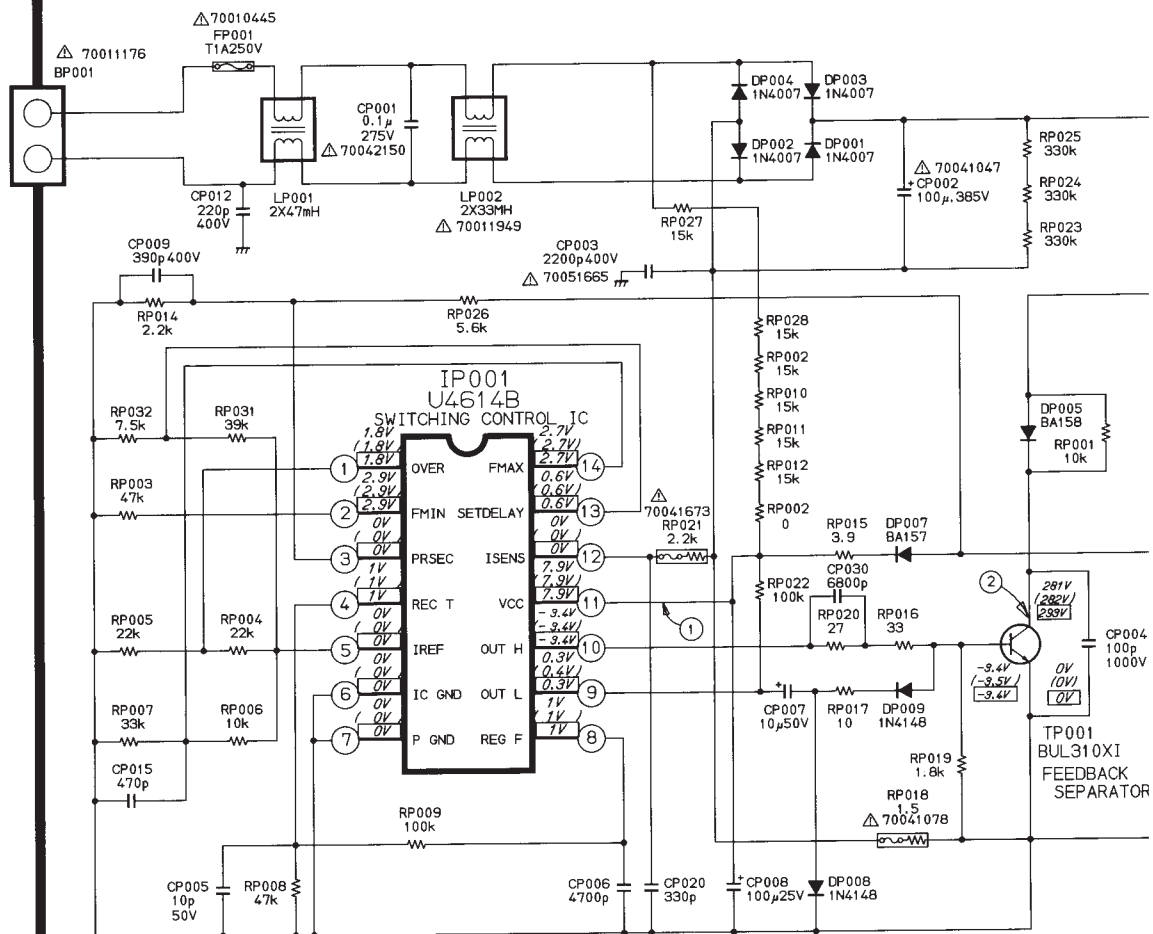
7-6-2. Conventional Audio Level Chart



## 8. CIRCUIT DIAGRAMS

### 8-1. Power Circuit Diagram

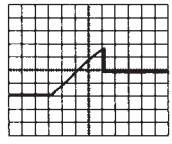
0150M POWER





① IP001, Pin ⑪

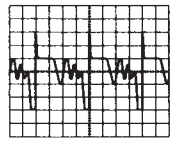
E-4



START-UP  
Vcc  
V:50V/div  
H:10ms/div

② TP001, Collector

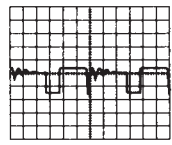
E-5



V:550Vp-p  
H:40μs/div

③ IP002, Pin ⑤

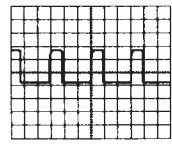
F-8



V:1V/div  
H:5μs/div

④ IP002, Pin ⑦

F-8

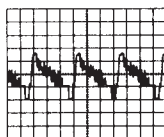


V:5V/div  
H:10μs/div

## 8-2. PIF Circuit Diagram

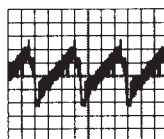
① 0020M, Pin ⑥

E-7

VIDEO  
OUT  
V:1V/div  
H:20 $\mu$ s/div

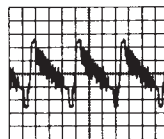
② 0020M, Pin ①

D-6

IF  
V:500mV/div  
H:20 $\mu$ s/div

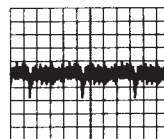
③ 0010M, Pin ⑤

C-7

MOD V IN  
V:200mV/div  
H:20 $\mu$ s/div

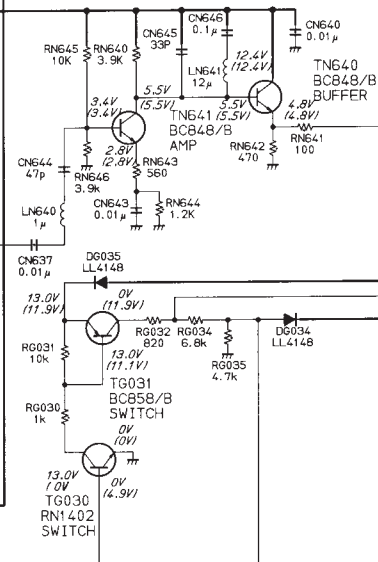
④ 0020M, Pin ⑧

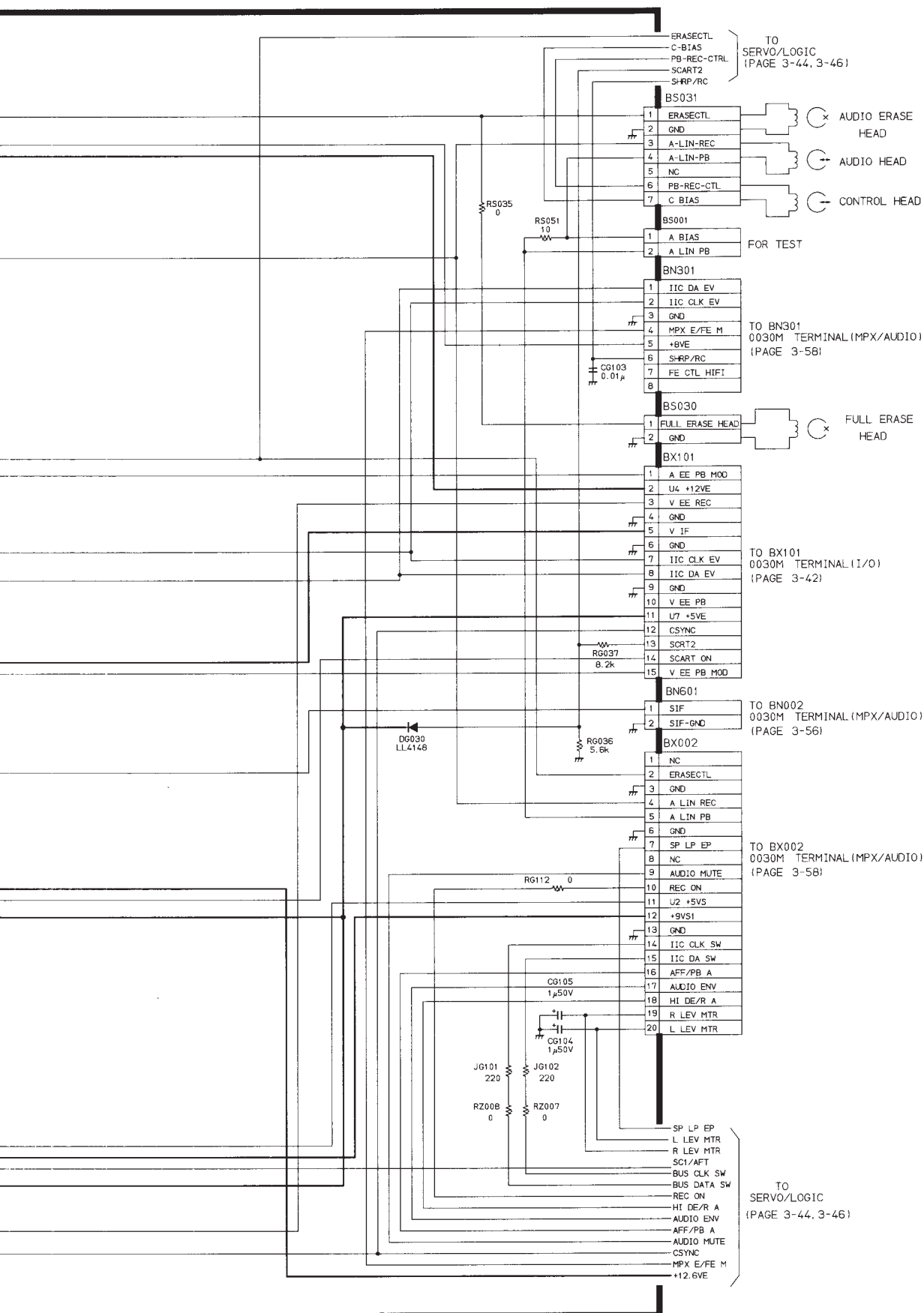
E-7

AUDIO  
OUT  
V:500mV/div  
H:5ms/div



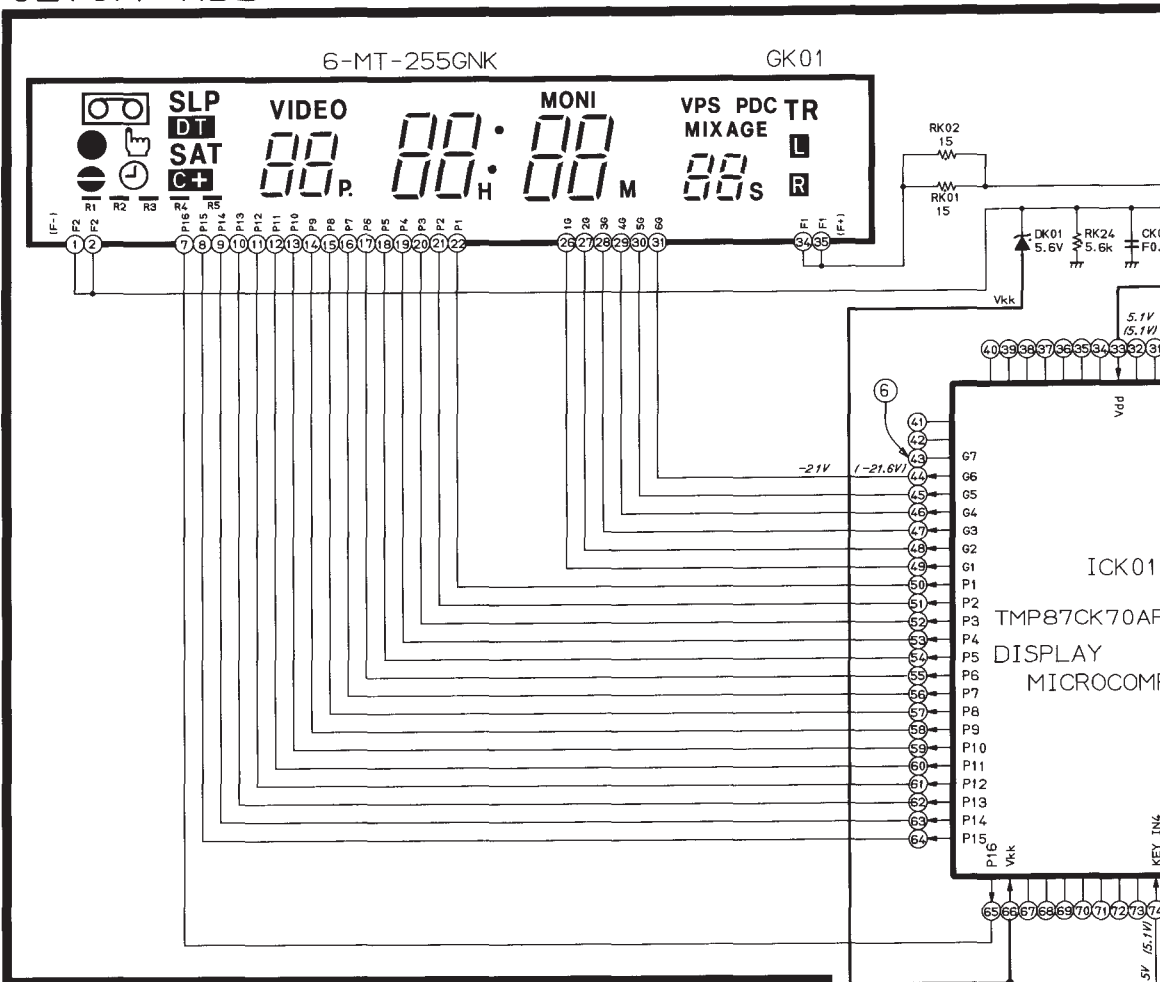




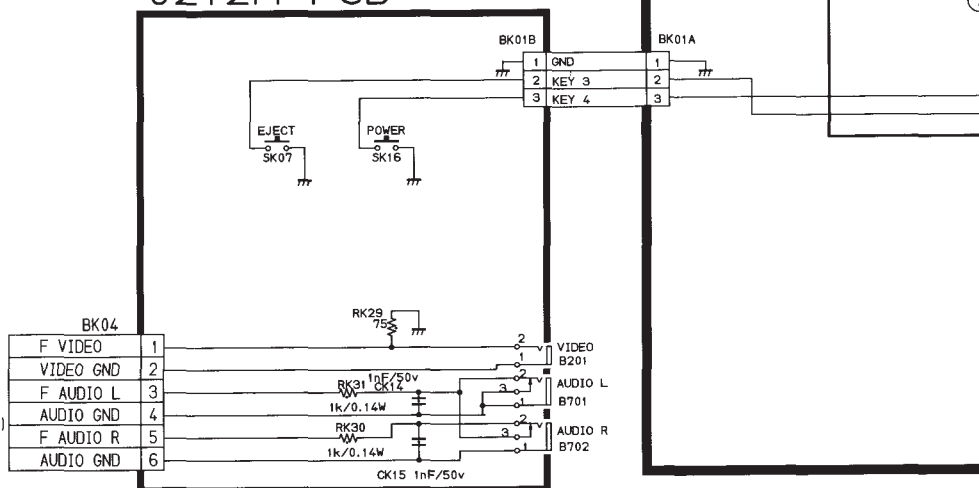


# 8-3. KDB Circuit Diagram

0210M KDB

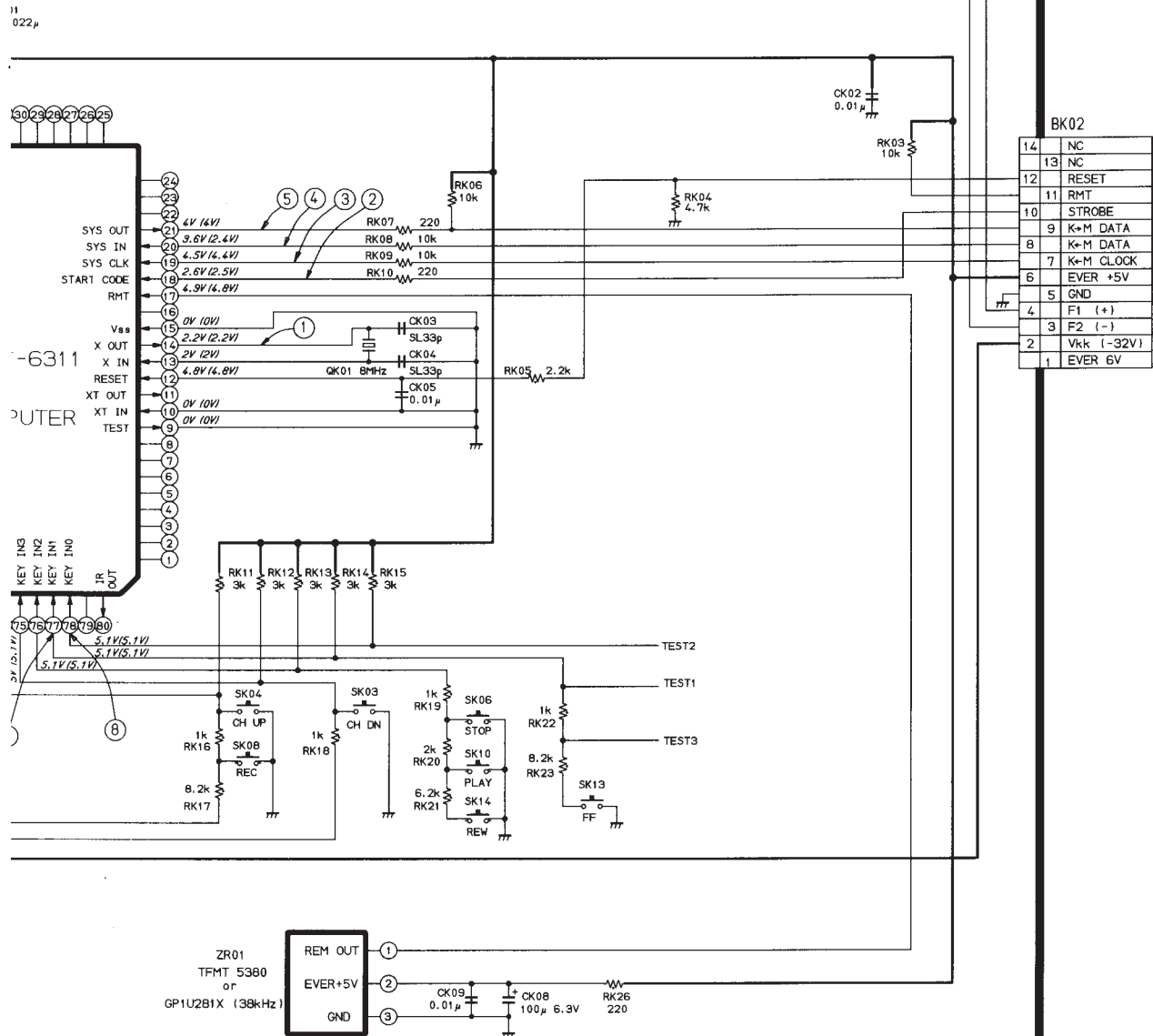


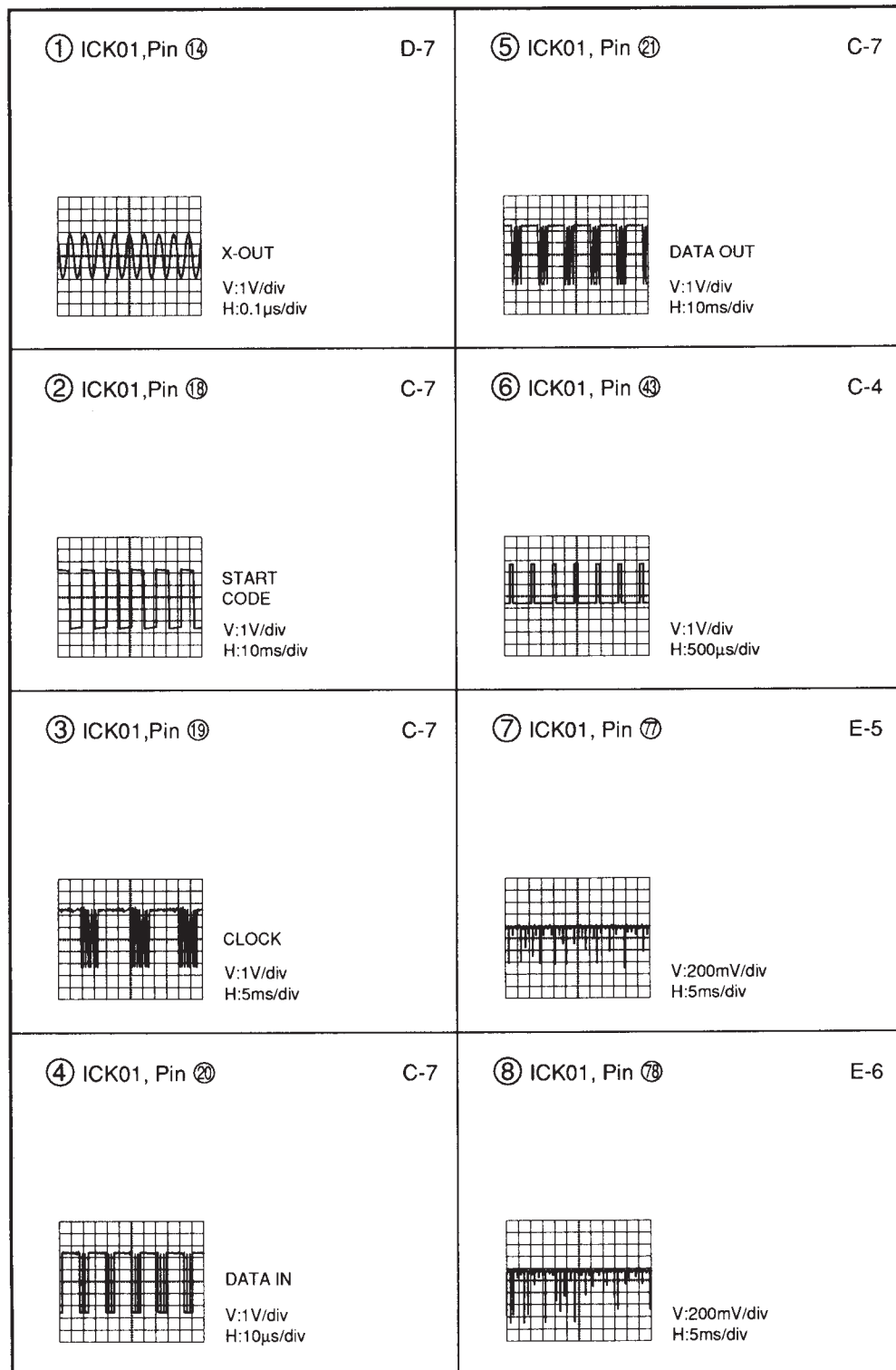
0212M FCB



TO BX003  
0030M  
TERMINAL (MPX/AUDIO)  
(PAGE 3-58)

V:REC ( V ):PLAY





## 8-4. Terminal (I/O) Circuit Diagram

A

B

C

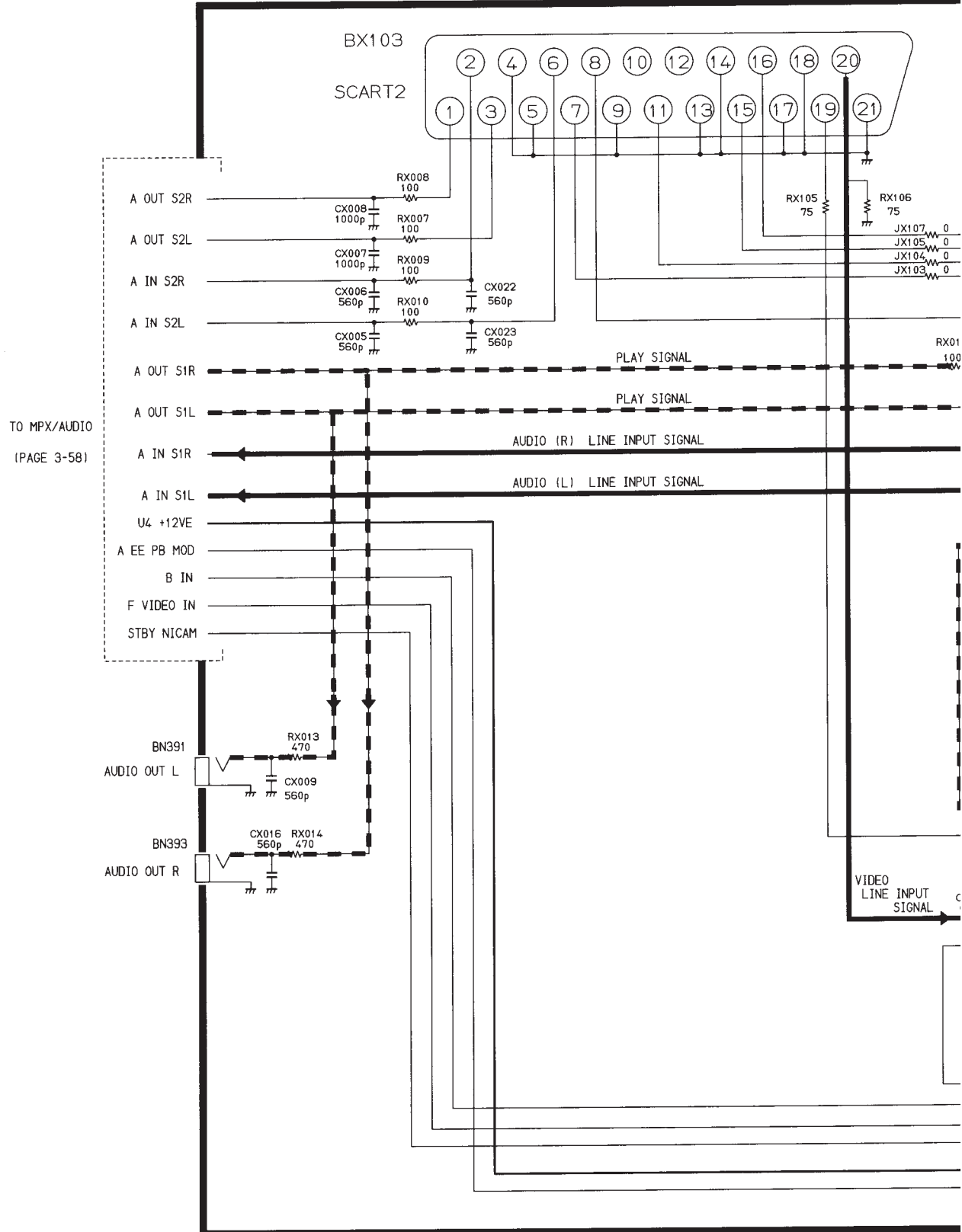
D

E

F

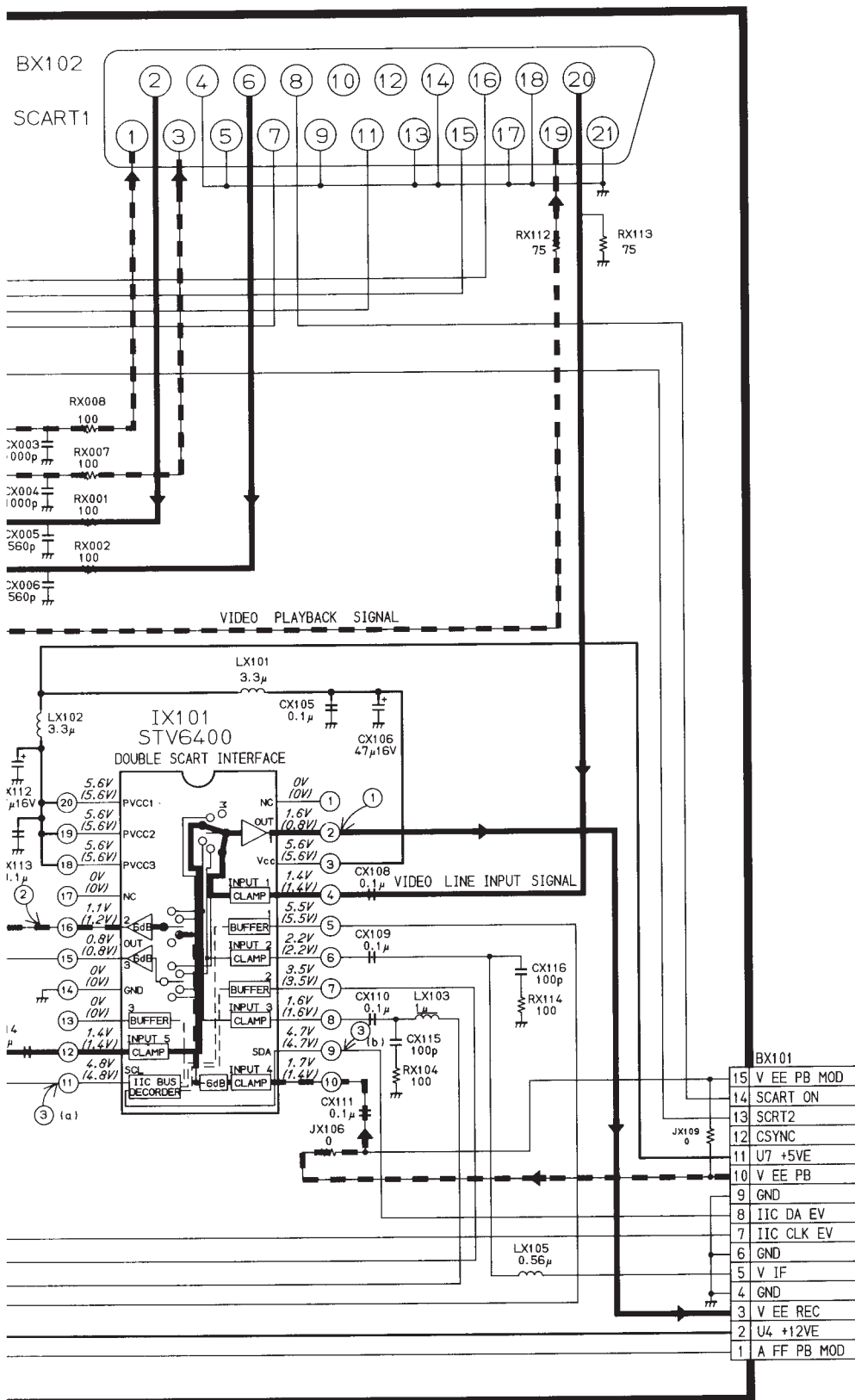
G

## 0030M TERMINAL (I/O)





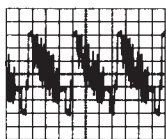
— REC SIGNAL  
 - - - PLAY SIGNAL



TO BX101  
 0005M PIF  
 (PAGE 3-37)

① IX101, Pin ②

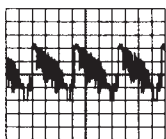
E-7



V:200V/div  
H:20 $\mu$ s/div

② IX101, Pin ⑩

E-6



V:500mV/div  
H:20 $\mu$ s/div

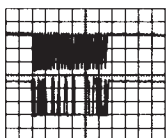
③ IX101

(a) Pin ⑪ (SCL)

F-6

(b) Pin ⑨ (SDA)

F-7



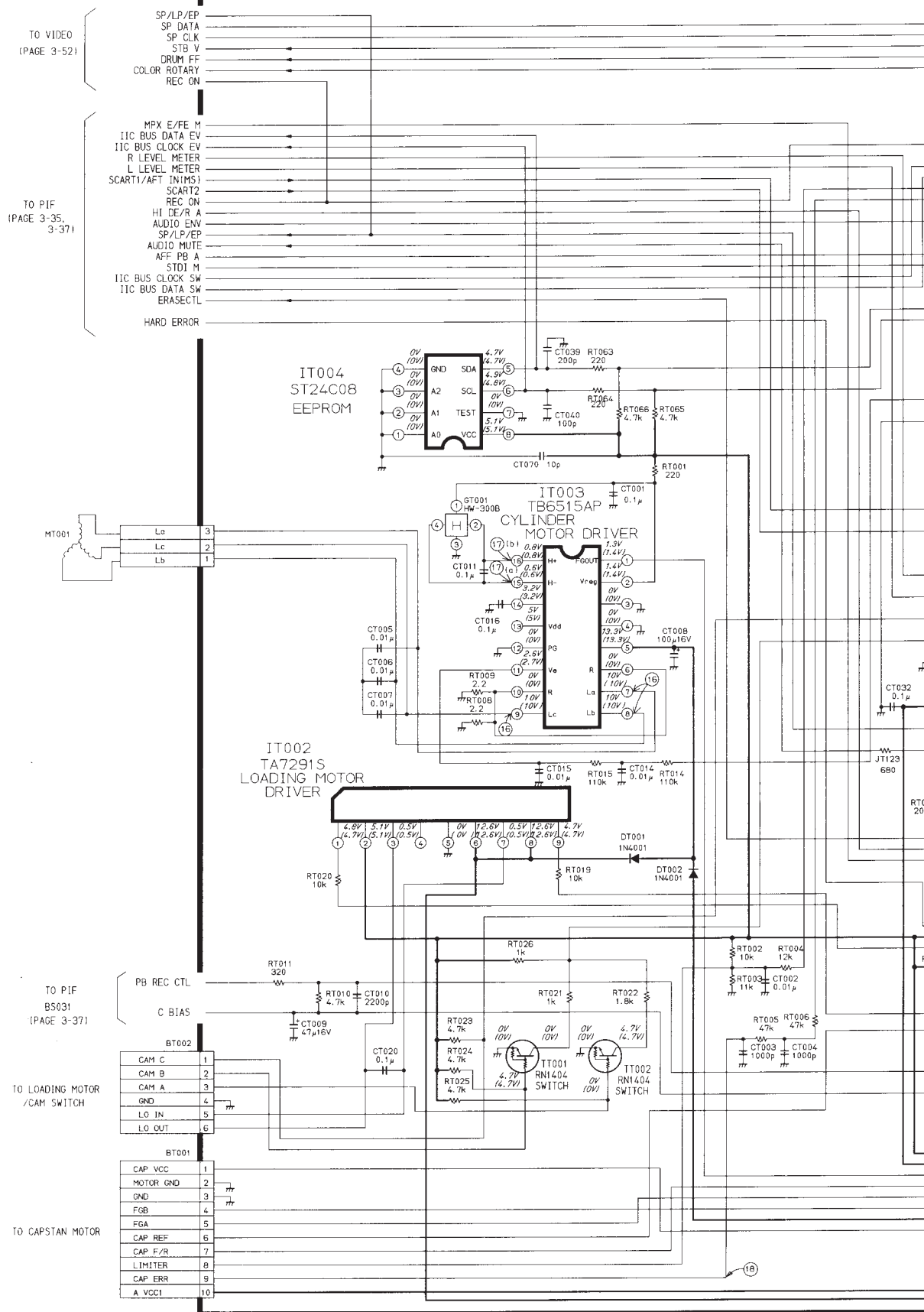
(a)

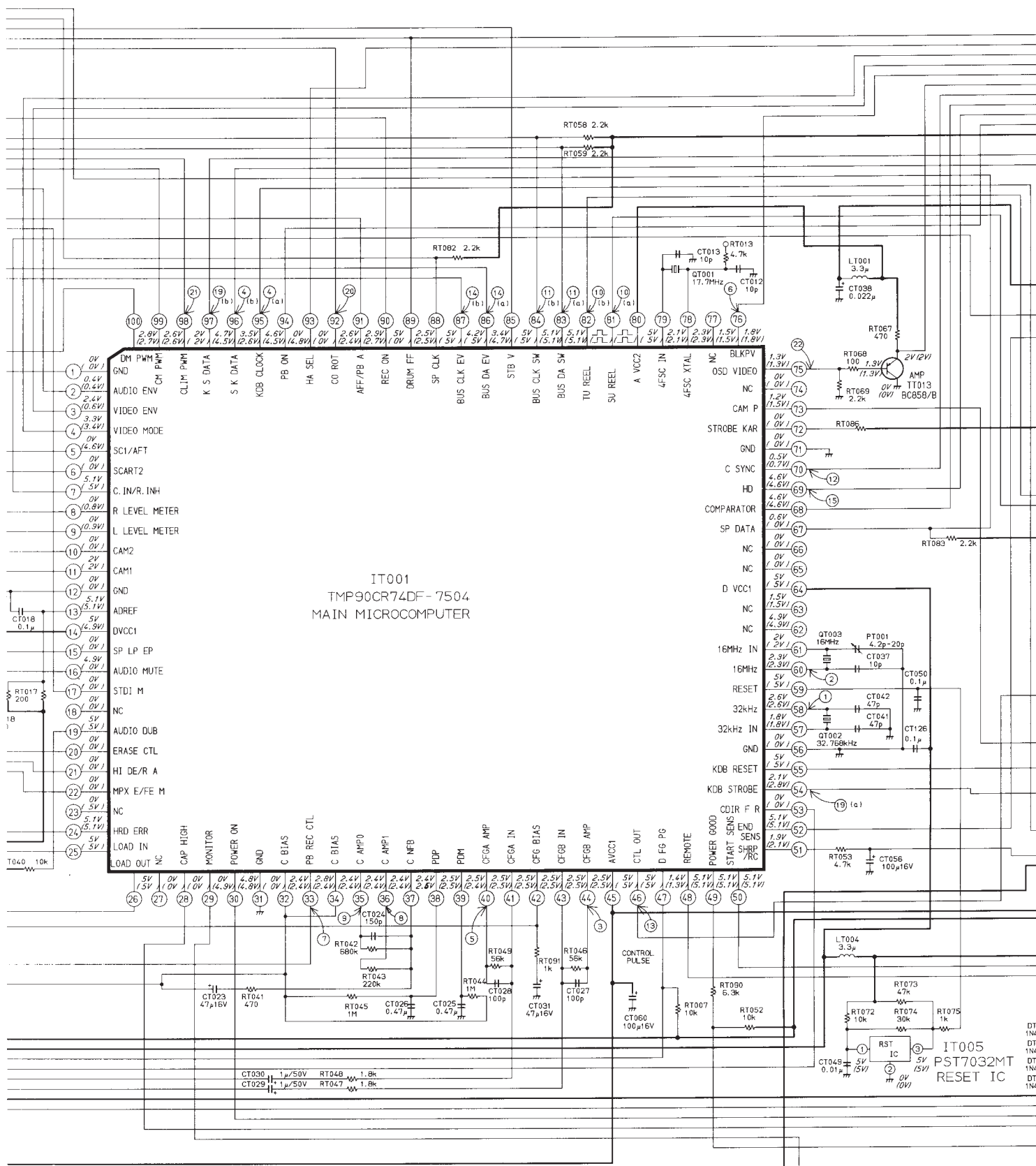
(b)

V:2V/div  
H:200 $\mu$ s/div

# 8-5. SERVO/LOGIC CIRCUIT DIAGRAM

0005M MAIN(SERVO/LOGIC)





HA SEL  
VIDEO MODE  
VIDEO ENV  
BLK/PV/PH  
OSD VID  
C SYNC  
COMPARATOR  
HD  
PB ON  
PB YC1

TO VIDEO  
(PAGE 3-52)

U2 +5VS

TO PIF  
(PAGE 3-35)

BW005

1 PB YC1  
2 GND  
3 DRUM FF  
4 CTL OUT

FOR TEST

CT034 220p  
CT035 220p  
CT036 1000p

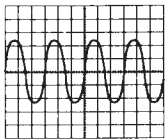
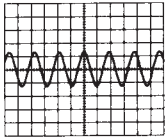
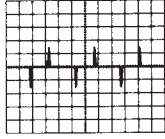
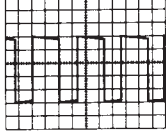
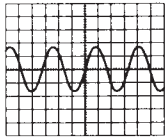
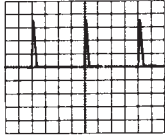
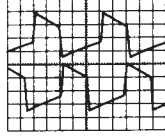
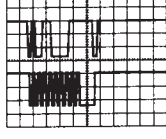
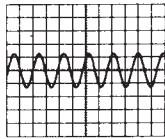
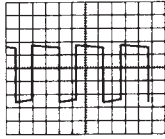
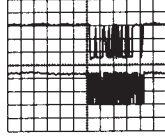
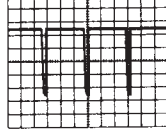
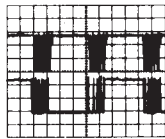
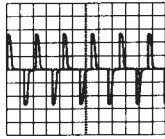
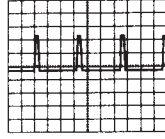
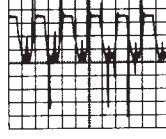
BT003 I/O


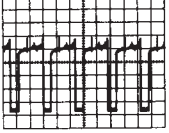
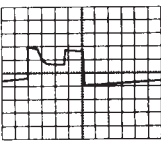
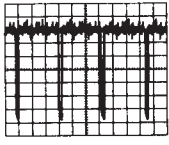
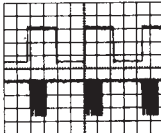
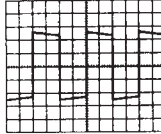
14 CAM P  
13 +14VE  
12 KDB RESET  
11 REMOTE  
10 KDB STOROE  
9 KDB SERVO DATA  
8 SERVO KDB DATA  
7 KDB CLOCK  
6 +5VD  
5 GND  
4 UH+  
3 UH-  
2 U5 -32VE  
1 +6VE1 1R

TO BK02  
0210M KDB  
(PAGE 3-39)

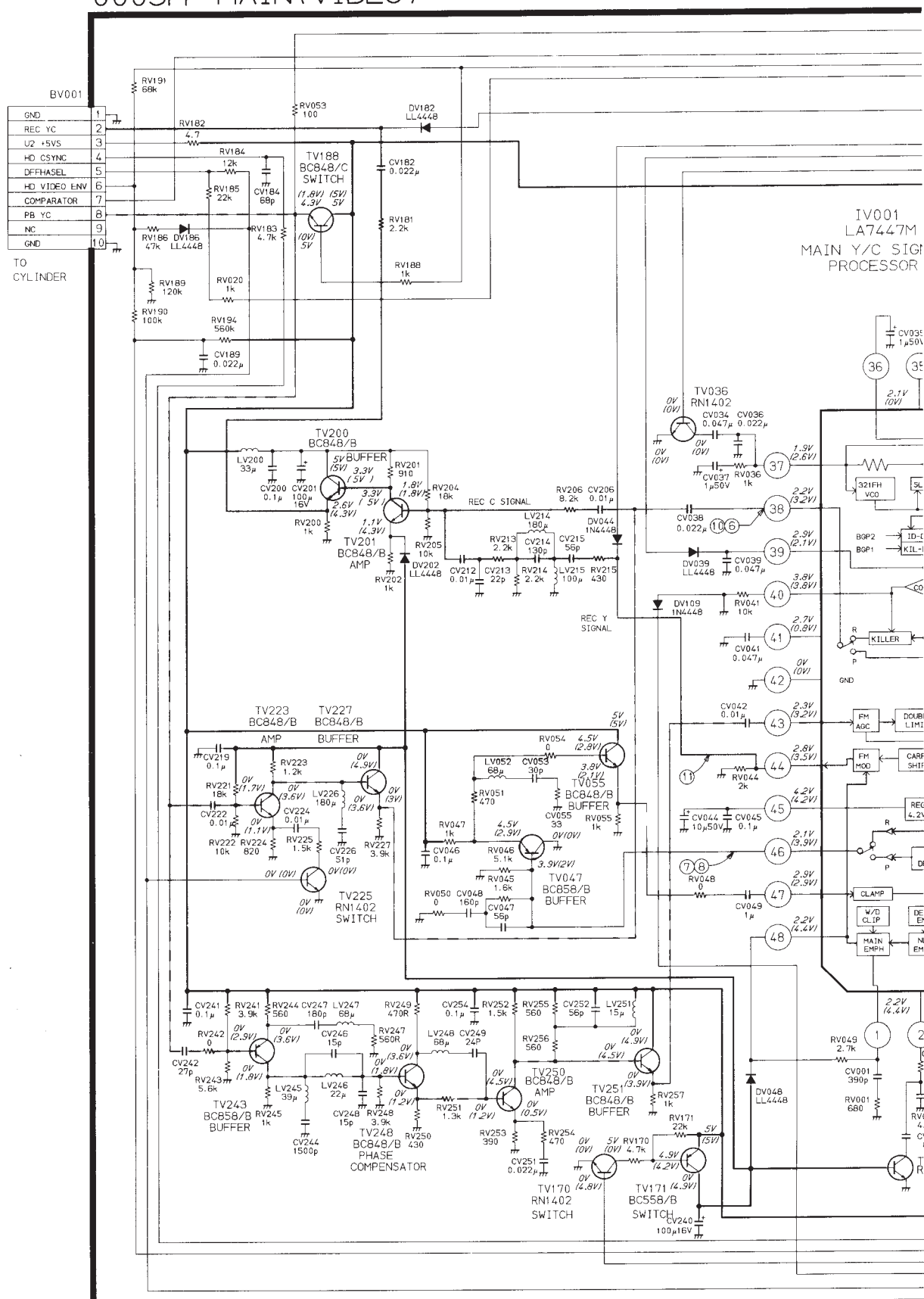
SHRP/RC  
+14VE  
U5 -32VE  
UH+  
UH-  
VM +20VE  
+6VE  
POWER GOOD  
+6VE1  
MONITOR

TO PIF  
(PAGE 3-35, 3-37)

<p>① IT001, Pin 58 E-10</p>  <p>V:2V/div H:10μs/div</p>	<p>⑤ IT001, Pin 40 F-8</p>  <p>CFG.A,AMP SP PLAY V:500mV/div H:500μs/div</p>	<p>⑨ IT001, Pin 35 F-7</p>  <p>C.AMP0 PLAY (SP) V:1V/div H:10ms/div</p>	<p>⑬ IT001, Pin 46</p> 
<p>② IT001, Pin 60 E-10</p>  <p>V:2V/div H:0.02μs/div</p>	<p>⑥ IT001, Pin 76 C-9</p>  <p>PV/PH/BLK STILL V:1V/div H:10ms/div</p>	<p>⑩ IT001 (a) Pin 81 SP PLAY C-9 (b) Pin 82 SP PLAY C-9</p>  <p>(a) (b) V:2V/div H:100ms/div</p>	<p>⑭ IT001 (a) Pin 86 SP (b) Pin 87</p> 
<p>③ IT001, Pin 44 F-9</p>  <p>CPGB.AMP SP PLAY V:500mV/div H:500μs/div</p>	<p>⑦ IT001, Pin 33 F-7</p>  <p>R/P CTL REC V:1V/div H:10ms/div</p>	<p>⑪ IT001 (a) Pin 83 C-8 (b) Pin 84 C-8</p>  <p>(a) (b) V:2V/div H:200μV/div</p>	<p>⑮ IT001, Pin 69</p> 
<p>④ IT001 (a) Pin 95 (KDB CLOCK) C-7 (b) Pin 96 (S K DATA) C-7</p>  <p>(a) (b) V:2V/div H:5ms/div</p>	<p>⑧ IT001, Pin 36 F-7</p>  <p>C.AMP1 FF (SP) V:1V/div H:500μs/div</p>	<p>⑫ IT001, Pin 70 D-10</p>  <p>C SYNC V:2V/div H:20μs/div</p>	<p>⑯ IT003 Pin 7, 8 Pin 9</p> 

<p>F-9</p> <p>L OUT</p> <p>V/div</p> <p>0ms/div</p>	<p>① IT003</p> <p>(a) Pin ⑮ D-3</p> <p>(b) Pin ⑯ D-3</p>  <p>(b)</p> <p>(a) V:100mV/div H:10ms/div</p>	<p>② IT001, Pin ② C-6</p>  <p>CAP</p> <p>V:1V/div H:10μs/div</p>
<p>AY</p> <p>C-8</p> <p>C-8</p> <p>V/div</p> <p>20μs/div</p>	<p>③ BT001, Pin ③ G-4</p>  <p>CAP ERR SP SLOW</p> <p>V:2V/div H:20ms/div</p>	<p>④ IT001, Pin ⑦ C-10</p>  <p>OSD VIDEO</p> <p>V:1V/div H:20μs/div</p>
<p>D-10</p> <p>V/div</p> <p>20μs/div</p>	<p>⑤ IT001</p> <p>(a) Pin ⑤ (KDB STROBE) E-10</p> <p>(b) Pin ⑦ (K→S DATA) C-6</p>  <p>(a)</p> <p>(b) V:2mV/div H:5ms/div</p>	
<p>D-4</p> <p>D-3</p> <p>V/div</p> <p>ms/div</p>	<p>⑥ IT001, Pin ② C-7</p>  <p>COLOR ROTARY (SP)</p> <p>V:1V/div H:10ms/div</p>	

## 0005M MAIN(VIDEO)





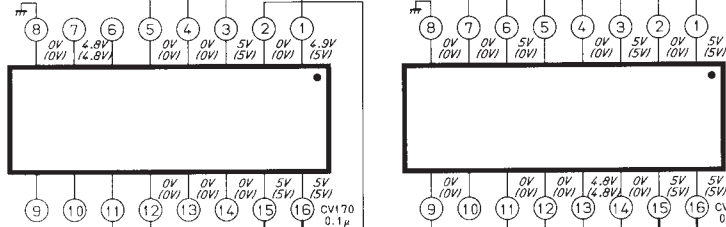


V:REC REC SIGNAL  
( V):PLAY PLAY SIGNAL

TO SERVO/LOGIC  
(PAGE 3-44,3-46)

PB YC1  
DRUM FF  
COMPARATOR  
REC ON  
  
SP CLK  
SP DATA  
STB V  
4.23/3.58NTSC  
MESECAM  
EDIT  
AUTOPRCG  
WL ON

70  
34B  
RE  
TER  
RV073  
0



IV120  
74HC4053  
MULTIPLEXER  
/DEMULPLEXER

TO PIF  
(PAGE 3-35)

U2 +5VS  
V EE PB  
SP LP EP

TO PIF  
(PAGE 3-35)

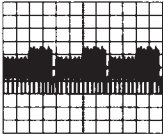
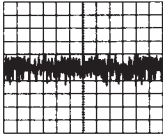
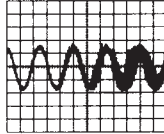
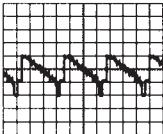

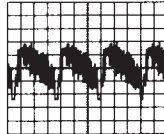
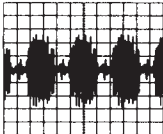
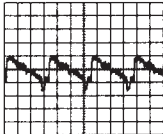
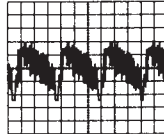
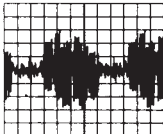
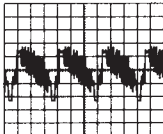
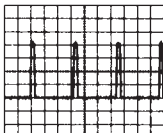

U1 +12VS  
V EE REC

TO SERVO/LOGIC  
(PAGE 3-44,3-46)

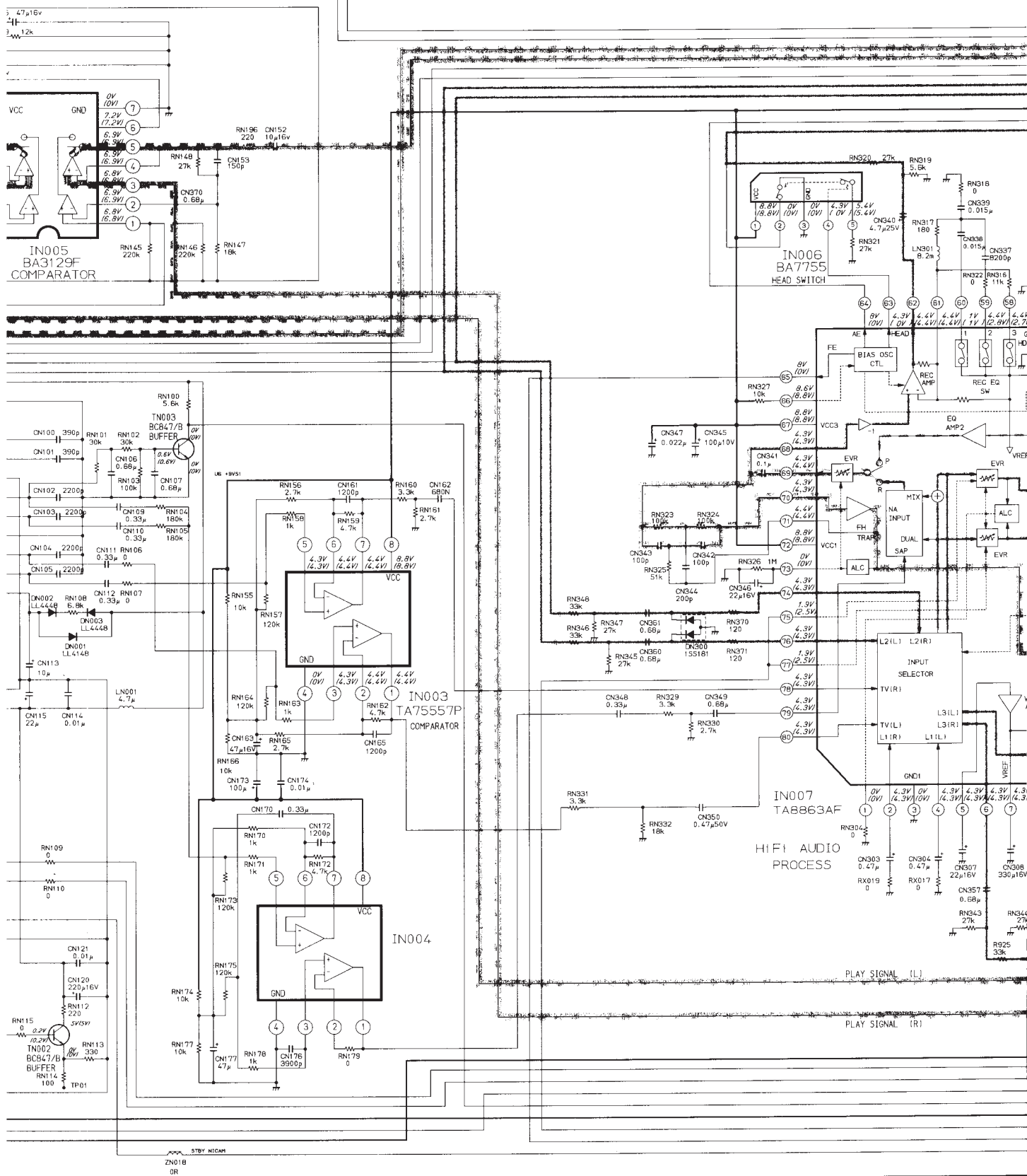
VIDEO MODE  
BLKPV  
VD  
CSYNC  
HD  
OSD VID  
SP LP EP  
COL ROT  
PB ON  
  
VIDEO ENV  
HA SEL

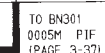
IV160  
BA7046  
SYNCHRONIZATION  
SEPARATOR

/110  
444B

<p>① IV001, Pin ⑮ E-9</p>  <p>PLAY V:100mV/div H:5ms/div</p>	<p>⑥ IV001, Pin ⑳ D-4</p>  <p>PLAY V:100mV/div H:10ms/div</p>	<p>⑪ IV001, Pin ㉔ E-4</p>  <p>REC (SP) V:200mV/div H:0.1μs/div</p>
<p>② IV001, Pin ⑮ E-9</p>  <p>PLAY V:100mV/div H:20μs/div</p>	<p>⑦ IV001, Pin ㉔ E-4</p>  <p>PLAY V:100mV/div H:50μs/div</p>	<p>⑫ IV001, Pin ⑦ F-6</p>  <p>REC V:100mV/div H:20μs/div</p>
<p>③ IV001, Pin ⑰ E-9</p>  <p>PLAY V:50mV/div H:20μs/div</p>	<p>⑧ IV001, Pin ㉔ E-4</p>  <p>PLAY V:200mV/div H:20μs/div</p>	<p>⑬ TV011, Emitter (75Ω load) G-7</p>  <p>REC V:500mV/div H:20μs/div</p>
<p>④ IV001, Pin ㉑ D-9</p>  <p>PLAY V:50mV/div H:10μs/div</p>	<p>⑨ TV011, Emitter (75Ω load) G-7</p>  <p>PLAY V:50mV/div H:20μs/div</p>	
<p>⑤ IV001, Pin ⑨ G-7</p>  <p>PLAY V:1V/div H:20μs/div</p>	<p>⑩ IV001, Pin ㉔ D-4</p>  <p>REC (SP) V:50mV/div H:20μs/div</p>	



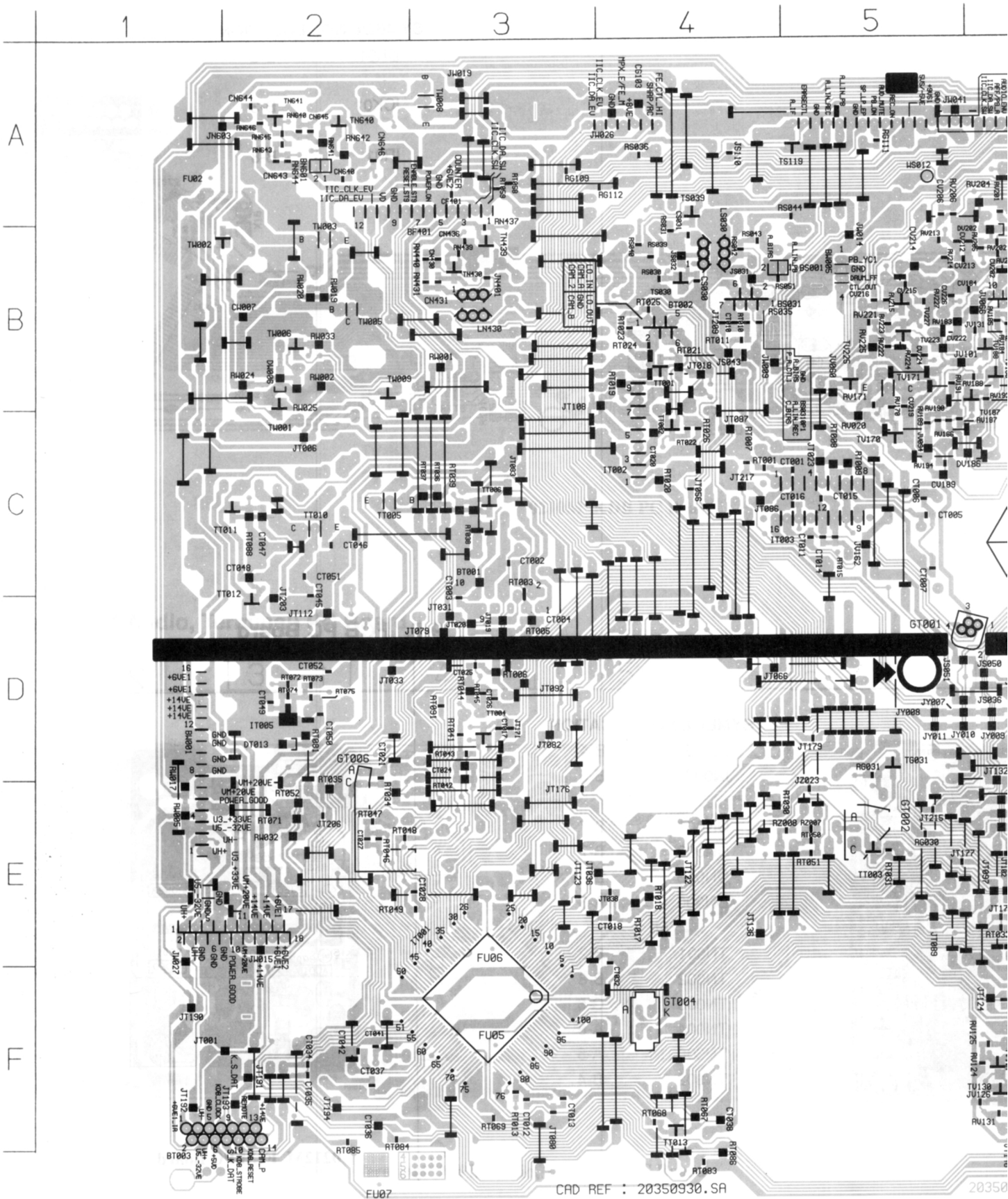


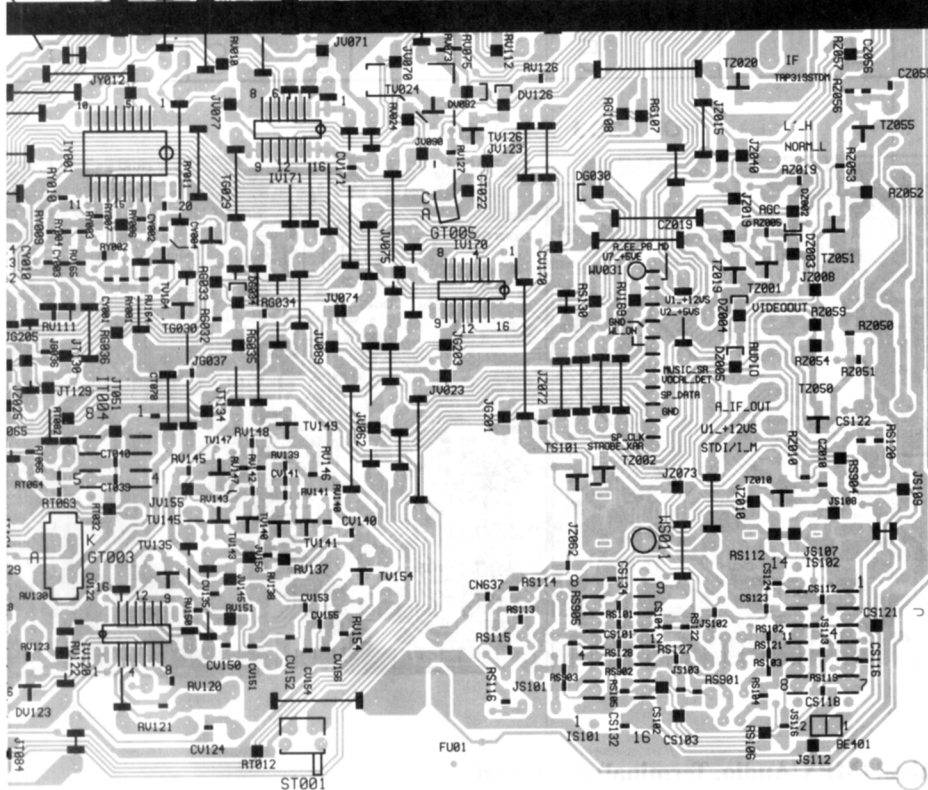




## 9. PC BOARDS

### 9-1. Main (PIF, Servo/Logic, Video) PC Board







**SYMBOL NO. LOCATION**

DG030 D-8

DG034 E-7

DT013 D-2

DV029 B-8

DV039 B-7

DV048 B-6

DV123 F-6

DV126 D-8

DV186 C-6

DV202 B-6

DZ001 A-9

GT001 D-5

GT002 E-5

GT003 F-6

GT004 F-4

GT005 E-8

GT006 D-2

IT001 E-3

IT002 C-4

IT003 C-5

IT004 E-6

IT005 D-2

IV001 B-7

IV060 C-7

IV120 F-6

IV160 C-7

IV170 E-8

IV171 D-7

TG030 E-7

TG031 D-5

TN640 A-2

TN641 A-2

TS030 B-4

TS039 A-4

TT001 B-4

TT002 C-4

TT003 E-5

TT005 C-2

TT006 C-3

**SYMBOL NO. LOCATION**

TT010 C-2

TT011 C-2

TT012 C-2

TT013 F-4

TV002 C-6

TV011 C-7

TV028 B-7

TV036 A-7

TV047 B-7

TV055 A-7

TV126 D-8

TV127 F-6

TV130 F-6

TV135 F-6

TV140 F-7

TV141 F-7

TV143 F-7

TV145 F-6

TV147 E-7

TV149 E-7

TV154 F-7

TV170 C-5

TV171 B-5

TV188 B-6

TV200 A-6

TV201 A-6

TV223 B-5

TV225 B-5

TV227 B-5

TV243 B-6

TV248 B-6

TV250 A-7

TV251 B-7

TW001 C-2

TW002 B-1

TW003 A-2

TW005 B-2

TW006 B-2

TW008 A-3

TW009 B-2

TZ020 D-9

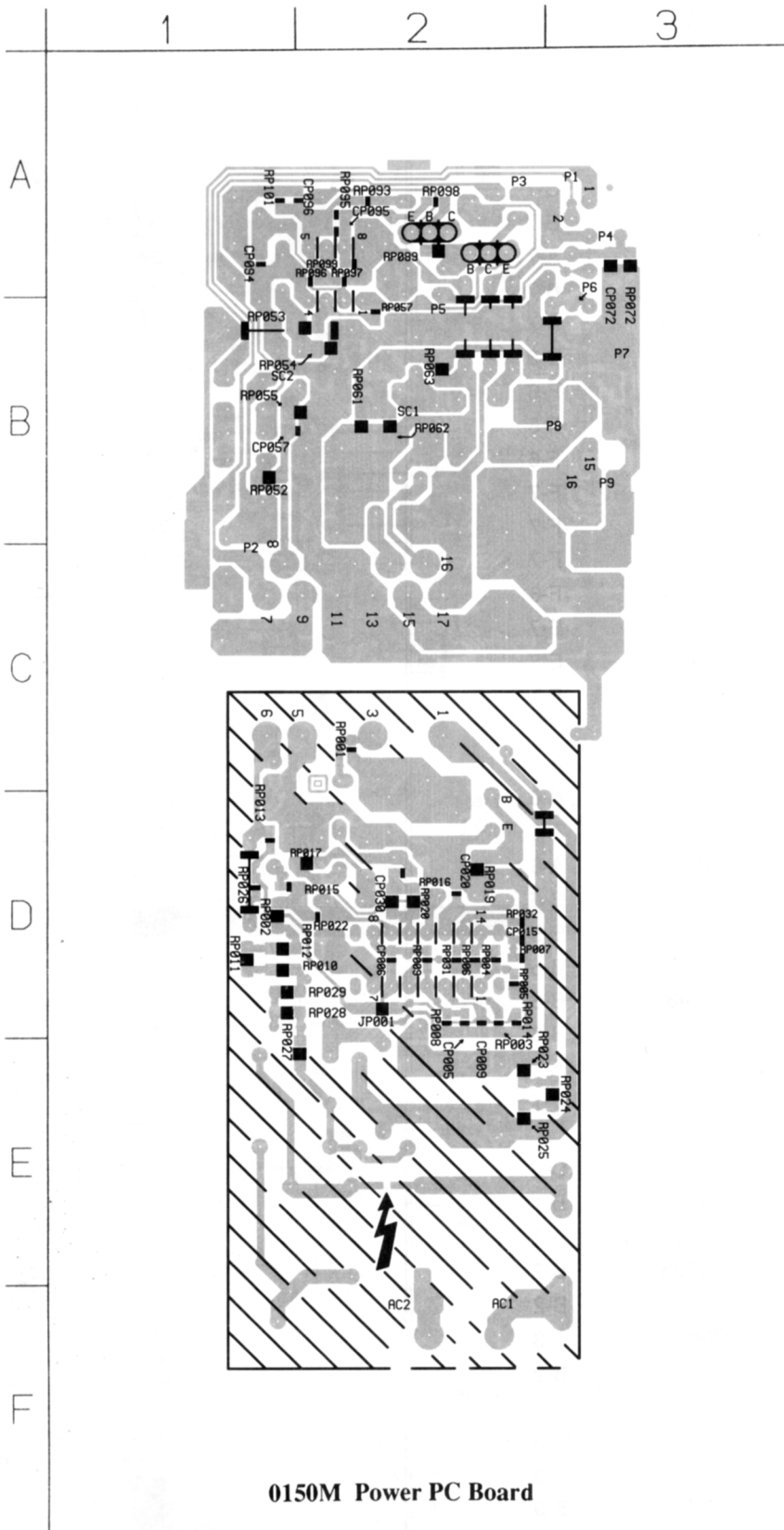
TZ032 A-9

TZ050 E-9

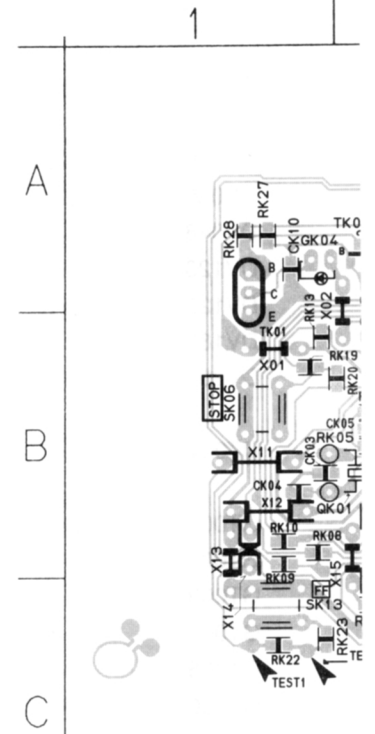
TZ051 E-9

TZ057 A-9

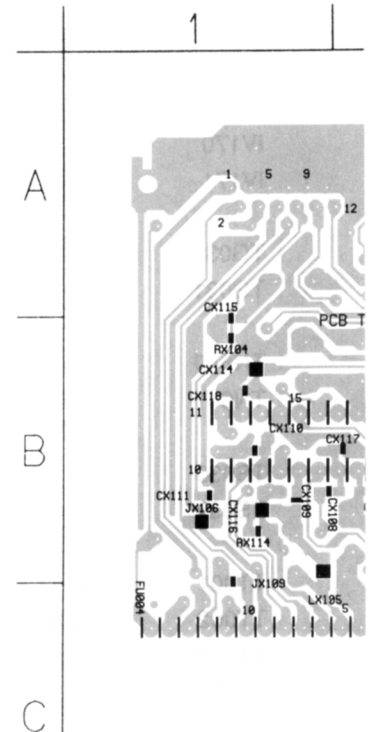
## 9-2. Power PC Board



## 9-3. KD



## 9-4. Ter



2	3	4	5	6	7
---	---	---	---	---	---



2	3	4	5	6	7
---	---	---	---	---	---



SYMBOL NO.	LOCATION
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
16	1000
17	1000
18	1000
19	1000
20	1000
21	1000
22	1000
23	1000
24	1000
25	1000
26	1000
27	1000
28	1000
29	1000
30	1000
31	1000
32	1000
33	1000
34	1000
35	1000
36	1000
37	1000
38	1000
39	1000
40	1000
41	1000
42	1000
43	1000
44	1000
45	1000
46	1000
47	1000
48	1000
49	1000
50	1000
51	1000
52	1000
53	1000
54	1000
55	1000
56	1000
57	1000
58	1000
59	1000
60	1000
61	1000
62	1000
63	1000
64	1000
65	1000
66	1000
67	1000
68	1000
69	1000
70	1000
71	1000
72	1000
73	1000
74	1000
75	1000
76	1000
77	1000
78	1000
79	1000
80	1000
81	1000
82	1000
83	1000
84	1000
85	1000
86	1000
87	1000
88	1000
89	1000
90	1000
91	1000
92	1000
93	1000
94	1000
95	1000
96	1000
97	1000
98	1000
99	1000
100	1000

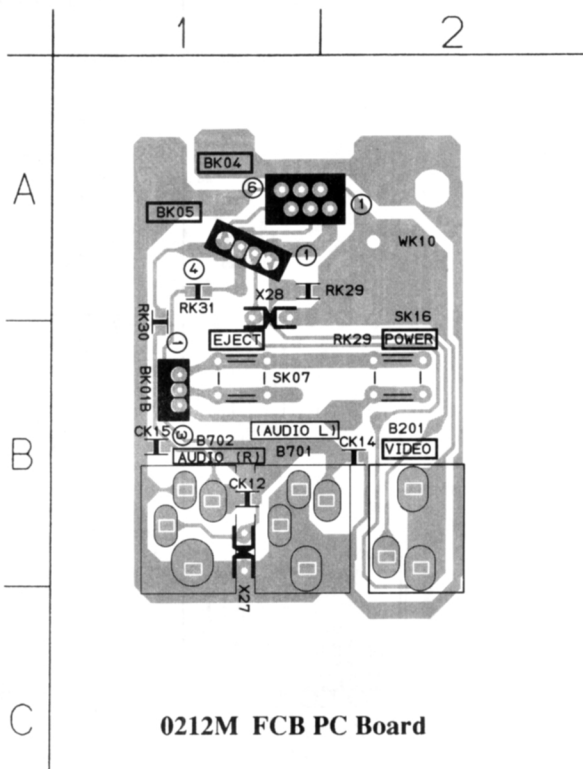
DK01	B-3
ICK01	B-3
IR01	B-8



### 9-5. FCB PC Board

SYMBOL NO.	LOCATION
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
16	1000
17	1000
18	1000
19	1000
20	1000
21	1000
22	1000
23	1000
24	1000
25	1000
26	1000
27	1000
28	1000
29	1000
30	1000
31	1000
32	1000
33	1000
34	1000
35	1000
36	1000
37	1000
38	1000
39	1000
40	1000
41	1000
42	1000
43	1000
44	1000
45	1000
46	1000
47	1000
48	1000
49	1000
50	1000
51	1000
52	1000
53	1000
54	1000
55	1000
56	1000
57	1000
58	1000
59	1000
60	1000
61	1000
62	1000
63	1000
64	1000
65	1000
66	1000
67	1000
68	1000
69	1000
70	1000
71	1000
72	1000
73	1000
74	1000
75	1000
76	1000
77	1000
78	1000
79	1000
80	1000
81	1000
82	1000
83	1000
84	1000
85	1000
86	1000
87	1000
88	1000
89	1000
90	1000
91	1000
92	1000
93	1000
94	1000
95	1000
96	1000
97	1000
98	1000
99	1000
100	1000

IN005	B-4
IN007	B-5
DN001	B-7
DN002	B-7
DN003	B-7
DN300	A-5
TN001	B-2
TN002	B-8
TN003	C-6
TN004	A-8
TN300	A-5
TN302	B-4



# SECTION 4 PARTS LIST

## SAFETY PRECAUTION

The parts identified by  $\triangle$  mark are critical for safety. Replace only with part number specified.

The mounting position of replacement is to be identical with originals.

The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

## NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

Parts marked # are of chip type and mounted on original PC boards.

However, when they are placed for servicing works, use discrete parts listed on the parts list.

## ABBREVIATIONS

### 1. Integrated circuit (IC)

### 2. Capacitor (Cap)

- Capacitance Tolerance (for Nominal Capacitance more than 10pF)

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	$\pm 0.1$	$\pm 0.25$	$\pm 0.5$	$\pm 1$	$\pm 2$	$\pm 5$	$\pm 10$	$\pm 20$	$\pm 30$

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	$+100$ 0	$+30$ $-10$	$+50$ $-10$	$+75$ $-10$	$+20$ $-10$	$+100$ $-10$	$+40$ $-20$	$+150$ $-10$	$+80$ $-20$

Ex.  $10\mu\text{F J} = 10\mu\text{F} \pm 5\%$

- Capacitance Tolerance (for Nominal Capacitance 10pF or less)

Symbol	B	C	D	F	G
Tolerance pF	$\pm 0.1$	$\pm 0.25$	$\pm 0.5$	$\pm 1$	$\pm 2$

Ex.  $10\text{pF G} = 10\text{pF} \pm 2\text{pF}$

### 3. Resistor (Res)

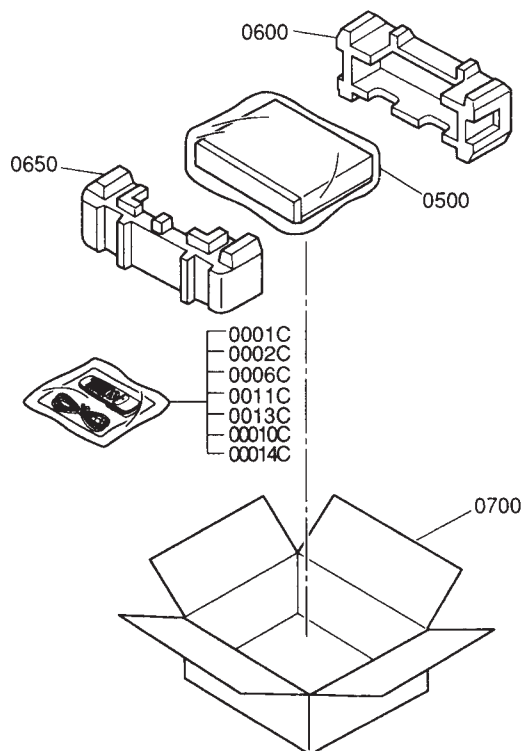
- Resistance tolerance

Symbol	B	C	D	F	G	J	K	M
Tolerance %	$\pm 0.1$	$\pm 0.25$	$\pm 0.5$	$\pm 1$	$\pm 2$	$\pm 5$	$\pm 10$	$\pm 20$

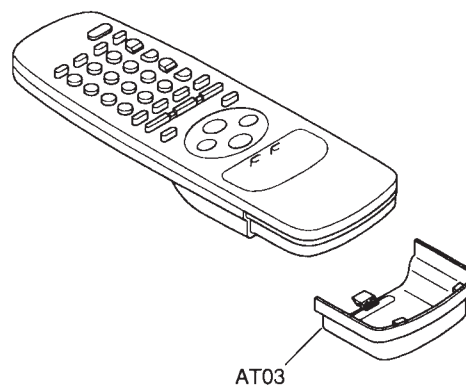
Ex.  $470\ \Omega \text{ J} = 470\Omega \pm 5\%$

## 4. EXPLODED VIEWS

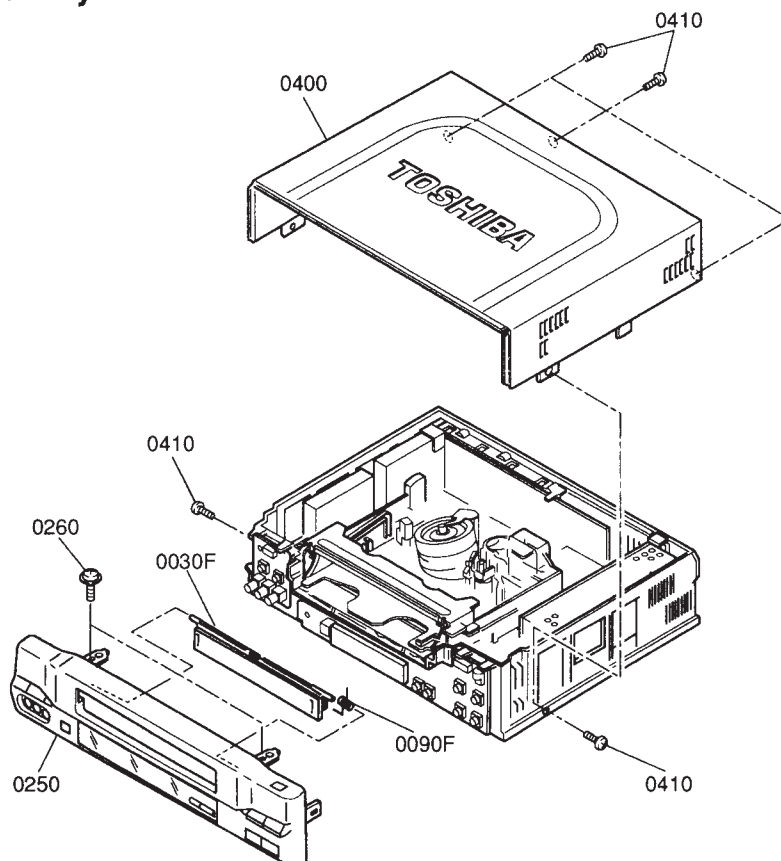
### 4-1. Packing Assembly



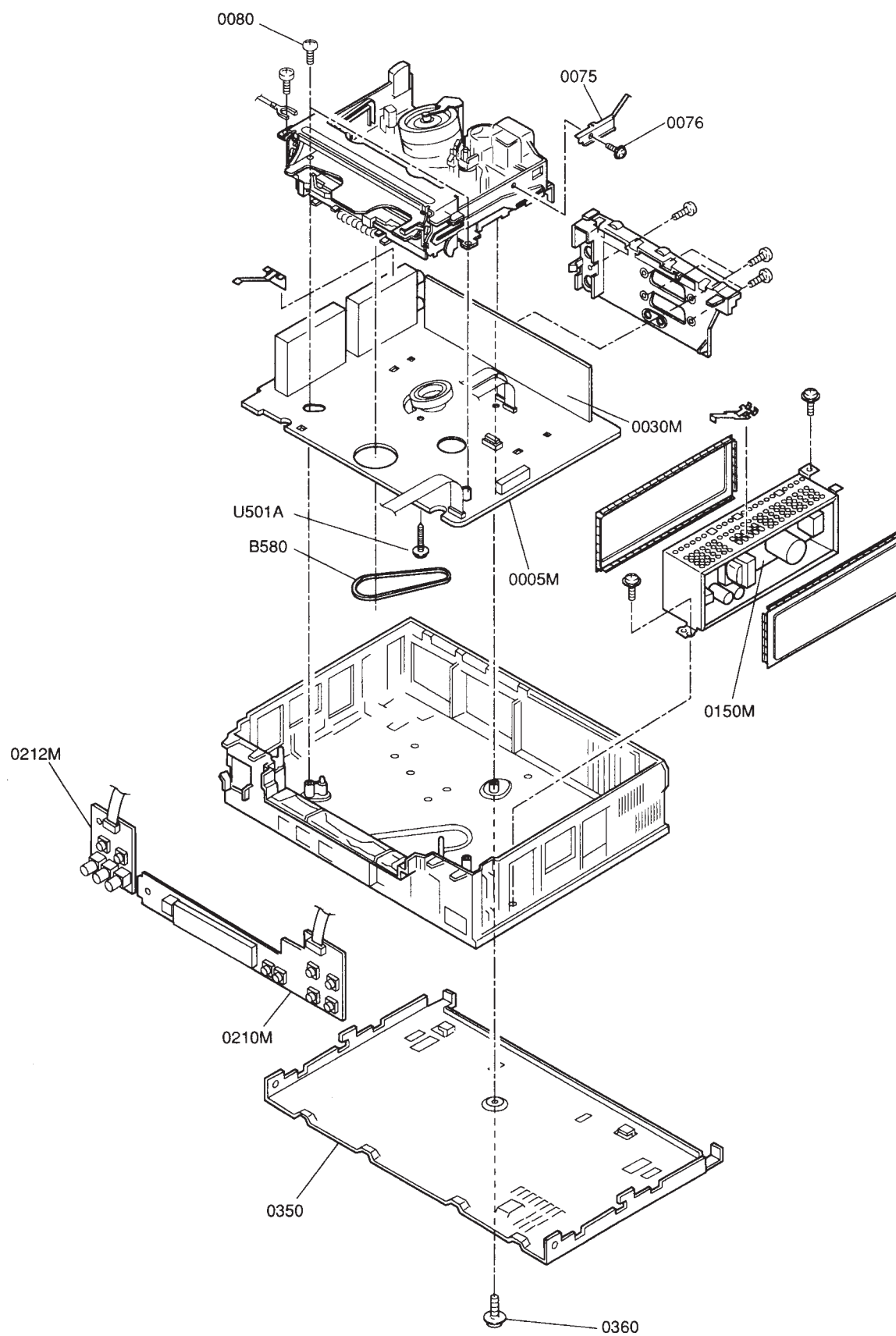
### 4-2. Remote Control Unit



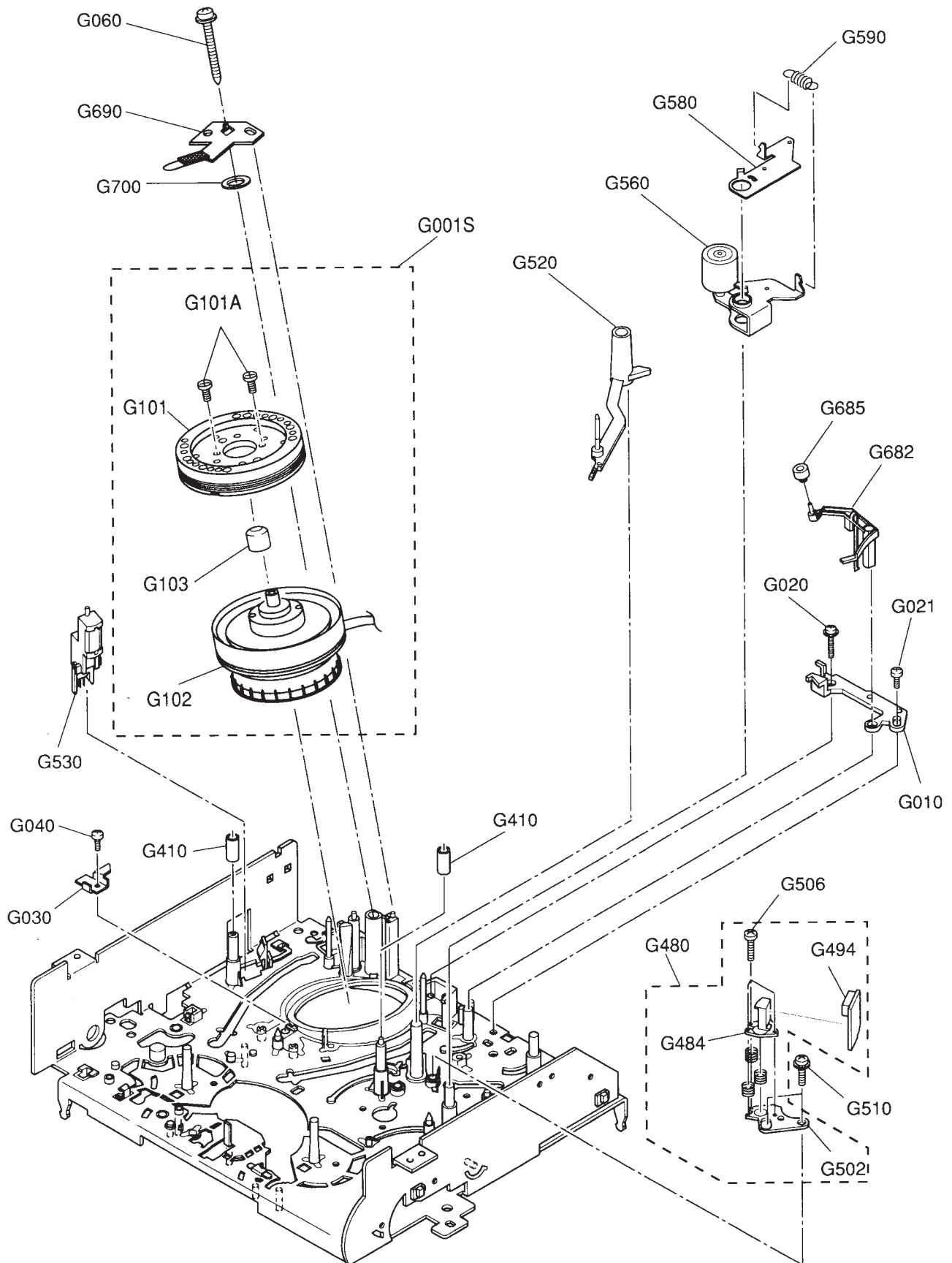
### 4-3. Cabinet Assembly



## 4-4. Chassis Assembly

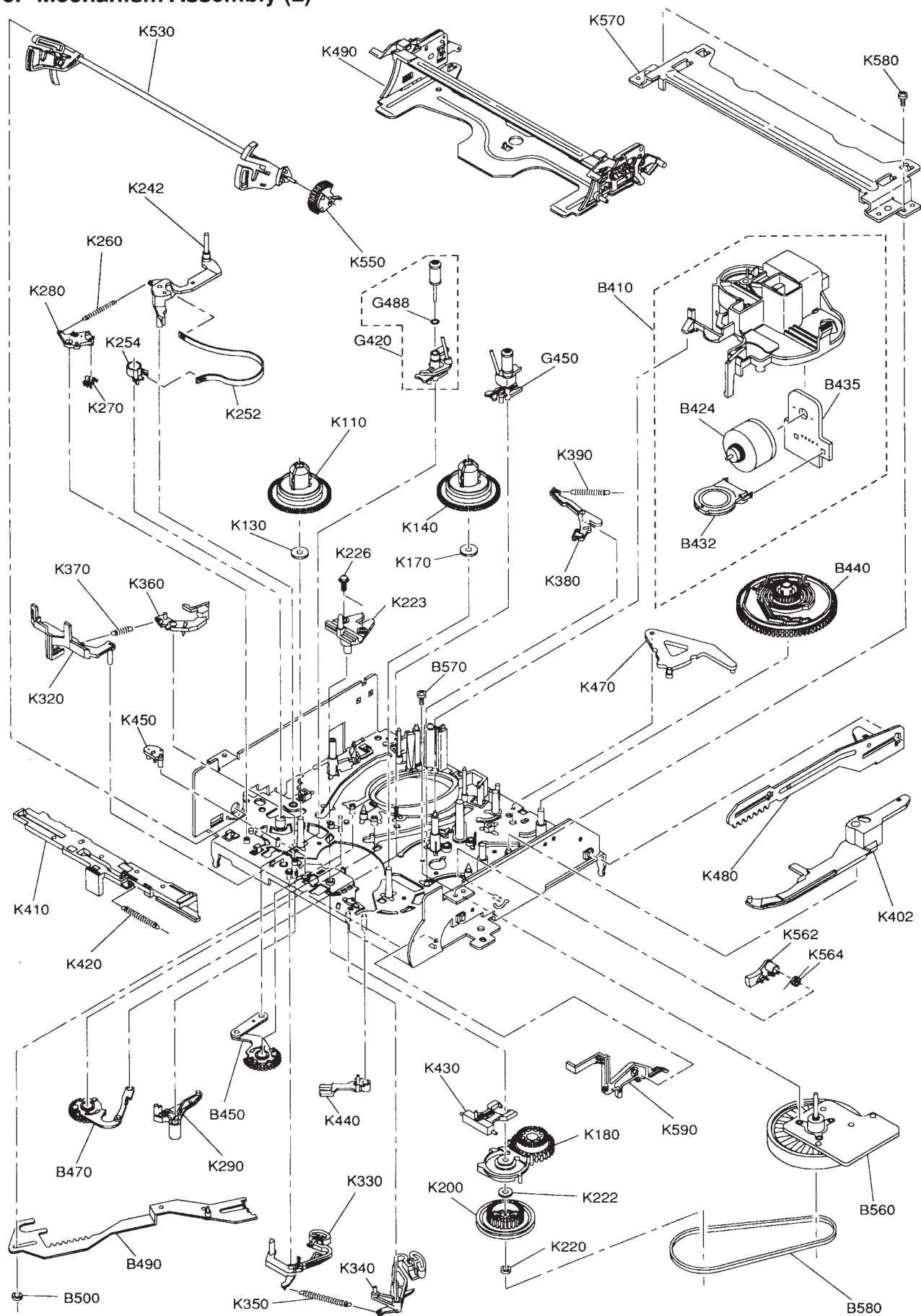


## 4-5. Mechanism Assembly (1)





## 4-6. Mechanism Assembly (2)



## 5. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	LOCATION NUMBER	PART NUMBER	DESCRIPTION
- MECHANICAL PARTS -					
△0001C	70061530	Owners Manual	K370	70031423	Spring
0002C	70061531	Owners Manual	K380	70031424	T Soft Brake Assy
0006C	70060040	Cover	K390	70031426	Spring
0010C	70012317	Remote Control Unit	K402	70031471	Drive Lever
0013C	70011442	Cable	K410	70031427	Cam Slider
0014C	70011387	Mains Cord	K420	70031428	Spring
0030F	70051691	Cassette Door	K430	70031472	Idle Up Down Lever
0090F	70051372	Spring	K440	70031473	Idle Kick Lever
0250	70051674	Front Panel	K450	70031476	Idle Centering Lever
0350	70051141	Bottom Plate	K470	70031477	Cam Lever
0400	70051620	Top Cover	K480	70031430	FL Drive Slider
△0450	70975164	Label	K490	70031431	Cassette Holder Assy
0600	70061500	Packing(Rear)	K530	70031415	Drive Arm Assy
0650	70061499	Packing(Front)	K550	70051150	Drive Lever Gear
0700	70917888	Case	K562	70031482	Arm Brake Lever
AT03	70107025	Case (Battery)	K564	70031440	Spring
B410	70031394	Loading Drive Assy	K570	70031441	Top Bracket
B424	70031396	Loading Motor Sub Assy	K590	70031483	Door Open Lever
B432	70031401	Cam Switch	U501A	70070070	Screw
B435	70031402	Loading Drive Unit			
B440	70051147	Cam Gear			
B450	70031404	S Loading Assy			
B470	70031408	T Loading Assy			
B490	70031412	Loading Slider Assy			
B560	70031498	Capstan Motor Assy			
B570	70070028	Screw, 2. 6x6mm			
B580	70031442	Reel Belt			
G001S	70031694	Cylinder Assy			
G010	70031444	Plate (Cylinder)			
G020	70031643	Screw			2. 6x5mm
G021	70031644	Screw			2. 6x5mm
G030	70031445	Plate (Cylinder)			
G040	70031644	Screw			2. 6x5mm
G060	70031449	Screw			
G101	70031695	Upper Cylinder Assy			
G101A	70031521	Screw			
G102	70031696	Lower Cylinder Assy			
G103	70031683	Ground Cap Assy			
G410	70031348	Guide Sleeve			
G420	70031349	S Slider Assy			
G448	70031505	O Ring			
G450	70031360	T Slider Assy			
G480	70031512	ACE Head Assy			
G484	70031511	ACE Sub Base Assy			
G504	70031508	Spring			
G520	70031370	No. 9 Guide Lever Assy			
G530	70031443	FE Head			
G560	70031384	Pinch Lever Assy			
G580	70031390	Pinch Drive Assy			
G590	70031392	Spring			
G680	70031493	Cleaner Lever Assy			
G690	70031540	Ground Brush			
K110	70031328	S Reel Assy			
K130	70031334	Washer			
K140	70031335	T Reel Assy			
K170	70031334	Washer			
K180	70031339	Idle Arm Assy			
K200	70031345	Center Gear Pully			
K220	70031503	Washer			
K222	70031527	Washer			
K242	70031374	Tension Lever Sub Assy			
K252	70031376	Band Brake Sub Assy			
K254	70031377	Band Holder			
K260	70031660	Spring			
K270	70031379	Hook Lever			
K280	70031380	Hook Lever			
K290	70031381	Tension Drive Lever			
K320	70031466	Rec Inhibit Lever			
K330	70031420	S Main Brake Assy			
K340	70031421	T Main Brake Assy			
K350	70031422	Spring			
K360	70031469	S Soft Brake Lever			

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
- ELECTRICAL PARTS -			
■0150M	70090933	P C Board Assy	Power
- INTEGRATED CIRCUITS -			
IP001	70011972	IC	U4614B
IP002	70011699	IC	LM393N
- TRANSISTORS -			
TP091	70011386	Transistor	2SA1020-Y
TP092	70010131	Transistor	BC337-40
- DIODES -			
DP001	70012286	Diode	1N4007
DP002	70012286	Diode	1N4007
DP003	70012286	Diode	1N4007
DP004	70012286	Diode	1N4007
DP005	70012416	Diode	BA158
DP007	70012469	Diode	BA157
DP008	70010817	Diode	1N4148
DP009	70010817	Diode	1N4148
DP041	70012468	Diode	BA157
DP042	70012468	Diode	BA157
DP051	70012338	Diode	BAV20
DP052	70012338	Diode	BAV20
DP061	70012433	Diode	MUR115
DP071	70012434	Diode	BAV20
DP081	70012339	Diode	1N5822
DP089	70010959	Diode, Zener	ZPD10
DP090	70012480	Diode	FUF5404
DP091	70012480	Diode	FUF5404
DP093	70010153	Diode	1N4148
DP094	70011286	Diode, Zener	ZPD5. 6
DP095	70012499	Diode	MUR115
- COILS -			
LP001	70011950	Line Filter	
△LP002	70011949	Line Filter	
△LP020	70012427	Power Transformer	TF-SMT13
LP051	70010922	Coil, Peaking	
LP071	23238916	Coil, Peaking	TRF4330AC
LP081	70012429	Coil, Peaking	
LP091	70012428	Coil, Peaking	
- CAPACITORS -			
△CP001	70042150	Cap, Plastic	100nF M
△CP002	70041047	Cap, Electrolytic	47 $\mu$ F M 385V
△CP003	70051665	Cap	2. 2nF 400V
CP004	70041370	Cap, Ceramic	100pF K 1kV
CP005	70040237	Cap, Ceramic, Chip	10pF D 50V
CP006	70040817	Cap, Ceramic	4. 7nF M 50V
CP007	24797100	Cap, Electrolytic	10 $\mu$ F M 50V
CP008	70040725	Cap, Electrolytic	100 $\mu$ F M 25V
CP009	70042162	Cap, Chip	390pF J 50V
CP015	70040248	Cap, Ceramic, Chip	470pF J 50V
CP020	70041063	Cap, Chip	330pF J 50V
CP030	70042149	Cap, Chip	6. 8nF M 50V
CP041	70040412	Cap, Electrolytic	220 $\mu$ F M 10V
CP051	24636010	Cap, Electrolytic	1 $\mu$ F M 50V
CP054	24797100	Cap, Electrolytic	10 $\mu$ F M 50V
CP055	70040096	Cap, Ceramic	470pF M 400V
CP056	70041633	Cap, Plastic	10nF K 100V
CP057	70042131	Cap, Chip	220pF J 50V
CP061	70042167	Cap, Electrolytic	220 $\mu$ F M 35V
CP071	70040772	Cap, Electrolytic	47 $\mu$ F M 50V
CP073	70040096	Cap, Ceramic	470pF M 400V
CP081	70041637	Cap, Electrolytic	1000 $\mu$ F M 16V
CP082	70041891	Cap, Electrolytic	1000 $\mu$ F X 16V
CP092	70042152	Cap, Electrolytic	0. 001F M 25V
CP093	70040772	Cap, Electrolytic	47 $\mu$ F M 50V
CP094	24092293	Cap, Chip	0. 1 $\mu$ F Z 25V
CP096	70040244	Cap, Ceramic, Chip	100pF J 50V
- RESISTORS -			
RP001	70040358	Res, Chip	10k $\Omega$ J 1/16W
RP003	70040363	Res, Chip	47k $\Omega$ J 1/16W
RP004	70040357	Res, Chip	22k $\Omega$ J 1/16W
RP005	70040357	Res, Chip	22k $\Omega$ J 1/16W
RP006	70040358	Res, Chip	10k $\Omega$ J 1/16W
RP007	70040362	Res, Chip	33k $\Omega$ J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
RP008	70040363	Res, Chip	47k $\Omega$
RP009	70041173	Res, Chip	100k $\Omega$
RP010	70040566	Res, Chip	15k $\Omega$
RP011	70040566	Res, Chip	15k $\Omega$
RP012	70040566	Res, Chip	15k $\Omega$
RP014	70040371	Res, Chip	2. 2k $\Omega$
RP015	70041939	Res, Chip	3. 9 $\Omega$
RP016	70040344	Res, Chip	33 $\Omega$
RP017	70040688	Res, Chip	10 $\Omega$
△RP018	70041078	Res, Fusible	1. 5 $\Omega$
RP019	70041167	Res, Chip	1. 8k $\Omega$
RP020	70040691	Res, Chip	27 $\Omega$
△RP021	70041673	Res, Fusible	2. 2k $\Omega$
RP022	70041173	Res, Chip	100k $\Omega$
RP023	70041272	Res, Chip	330k $\Omega$
RP024	70041272	Res, Chip	330k $\Omega$
RP025	70041272	Res, Chip	330k $\Omega$
RP026	70041940	Res, Chip	5. 6k $\Omega$
RP027	70040566	Res, Chip	15k $\Omega$
RP028	70040566	Res, Chip	15k $\Omega$
RP029	70040566	Res, Chip	15k $\Omega$
RP031	70041172	Res, Chip	39k $\Omega$
RP032	70041694	Res, Chip	7. 5k $\Omega$
△RP051	70041116	Res, Fusible	39 $\Omega$
RP052	70041353	Res, Chip	18k $\Omega$
RP053	70040682	Res, Chip	82k $\Omega$
RP054	70040134	Res, Chip	220k $\Omega$
RP055	70041354	Res, Chip	3. 9k $\Omega$
RP057	70041799	Res, Chip	820k $\Omega$
RP061	70041384	Res, Chip	1. 2k $\Omega$
RP062	70041384	Res, Chip	1. 2k $\Omega$
RP063	70041384	Res, Chip	1. 2k $\Omega$
△RP071	70041073	Res, Fusible	22 $\Omega$
RP072	70040566	Res, Chip	15k $\Omega$
RP089	70040690	Res, Chip	56 $\Omega$
△RP091	70042136	Res, Fuse	0. 47 $\Omega$
△RP092	70040125	Res, Carbon	47 $\Omega$
RP093	70040358	Res, Chip	10k $\Omega$
RP094	70040895	Res, Carbon	820 $\Omega$
RP096	70041938	Res, Chip	1k $\Omega$
RP097	70041941	Res, Chip	1. 5k $\Omega$
RP098	70040358	Res, Chip	10k $\Omega$
RP099	70040358	Res, Chip	10k $\Omega$
- MISCELLANEOUS -			
△BP001	70011176	Inlet	
△FP001	70010445	Fuse, 1A, 250V	
FP01A	70010597	Fuse Holder	
■0210M	70090887	P C Board Assy	KDB
- INTEGRATED CIRCUITS -			
ICK01	70012511	IC	TMP87CK70AF-6311
- DIODES -			
DK01	70011969	Diode, Zener	ZMM5. 6V
- CAPACITORS -			
CK01	24814223	Cap, Chip	2200pF
CK02	70041376	Cap, Chip	10nF
CK03	70041103	Cap, Chip	33pF
CK04	70041103	Cap, Chip	33pF
CK05	70041376	Cap, Chip	10nF
CK08	70041292	Cap, Electrolytic	100 $\mu$ F
CK09	70041376	Cap, Chip	10nF
- RESISTORS -			
RK01	70041168	Res, Chip	15 $\Omega$
RK02	70041168	Res, Chip	15 $\Omega$
RK03	70040358	Res, Chip	10k $\Omega$
RK04	70040373	Res, Chip	4. 7k $\Omega$
RK05	70041709	Res, Chip	2. 2k $\Omega$
RK06	70040358	Res, Chip	10k $\Omega$
RK07	70040350	Res, Chip	220 $\Omega$
RK08	70040358	Res, Chip	10k $\Omega$
RK09	70040358	Res, Chip	10k $\Omega$
RK10	70040350	Res, Chip	220 $\Omega$
RK11	70011425	Res, Chip	3k $\Omega$
RK12	70011425	Res, Chip	3k $\Omega$
RK13	70011425	Res, Chip	3k $\Omega$

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RK14	70011425	Res, Chip	3k $\Omega$	
RK15	70011425	Res, Chip	3k $\Omega$	
RK16	70040354	Res, Chip	1k $\Omega$	J 1/16W
RK17	70040374	Res, Chip	8. 2k $\Omega$	J 1/16W
RK18	70040354	Res, Chip	1k $\Omega$	J 1/16W
RK19	70040354	Res, Chip	1k $\Omega$	J 1/16W
RK20	70011426	Res, Chip	2k $\Omega$	
RK21	70041389	Res, Chip	6. 2k $\Omega$	J 1/10W
RK22	70040354	Res, Chip	1k $\Omega$	J 1/16W
RK23	70040374	Res, Chip	8. 2k $\Omega$	J 1/16W
RK24	70041138	Res, Chip	5. 6k $\Omega$	J 1/10W
RK26	70040350	Res, Chip	220 $\Omega$	J 1/16W
		- MISCELLANEOUS -		
GK01	70012437	FIP	6-MT-255GNK	
QK01	70010937	Resonator	8MHz	
SK03	23344094	Push Switch		
SK04	23344094	Push Switch		
SK06	23344094	Push Switch		
SK08	23344094	Push Switch		
SK10	23344094	Push Switch		
SK13	23344094	Push Switch		
SK14	23344094	Push Switch		
ZR01	70012350	F. U.	TFMT5380	
■0212M	70090893	P C Board Assy	FCB	
		- CAPACITORS -		
CK14	70041707	Cap, Chip	1nF	Z 50V
CK15	70041707	Cap, Chip	1nF	Z 50V
		- RESISTORS -		
RK29	70041441	Res, Chip	75 $\Omega$	J 1/10W
RK30	70040354	Res, Chip	1k $\Omega$	J 1/16W
RK31	70040354	Res, Chip	1k $\Omega$	J 1/16W
		- MISCELLANEOUS -		
B201	70011825	Phono Jack		
B701	70011823	Phono Jack		
B702	70011822	Phono Jack		
BK01B	23164505	Plug, 3P		
SK07	23344094	Push Switch		
SK16	23344094	Push Switch		
■0005M	70090913	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
IT001	70012512	IC	TMP90CR74DF-7504	
IT002	70011888	IC	TA7291S	
IT003	70011887	IC	TB6515AP	
IT004	70011892	IC	ST24C04	
IT005	70011808	IC	PST7032MT	
IV001	70012441	IC	LA7447M	
IV060	70012440	IC	LC89970M	
IV100	70012463	IC	LA7356M	
IV120	70012442	IC	74HC4053	
IV160	70010969	IC	BA7046	
IV170	70010981	IC	MC14094BD	
IV171	70010981	IC	MC14094BD	
		- TRANSISTORS -		
TG030	A6004020	Transistor, Chip	RN1402	
TG031	70010947	Transistor	BC858	
TN430	70012432	Transistor, Chip	2SC2859Y	
TN439	70010150	Transistor	BC848B	
TN640	70010150	Transistor	BC848B	
TN641	70010150	Transistor	BC848B	
TS030	70012432	Transistor, Chip	2SC2859Y	
TS039	70010150	Transistor	BC848B	
TT001	A6004040	Transistor, Chip	RN1404	
TT002	A6004040	Transistor, Chip	RN1404	
TT003	70010150	Transistor	BC848B	
TT005	70011386	Transistor	2SA1020-Y	
TT006	70010150	Transistor	BC848B	
TT010	70010131	Transistor	BC337-40	
TT011	70010942	Transistor	BC848	
TT012	70010942	Transistor	BC848	
TT013	70010947	Transistor	BC858	
TV002	A6004020	Transistor, Chip	RN1402	
TV011	70010947	Transistor	BC858	
TV028	70010150	Transistor	BC848B	

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
TV036	A6004020	Transistor, Chip	RN1402
TV047	70010947	Transistor	BC858
TV055	70010150	Transistor	BC848B
TV103	A6004020	Transistor, Chip	RN1402
TV126	70011788	Transistor, Chip	RN2402
TV127	70010947	Transistor	BC858
TV130	70010150	Transistor	BC848B
TV135	70010150	Transistor	BC848B
TV140	70010150	Transistor	BC848B
TV141	70010150	Transistor	BC848B
TV143	70010947	Transistor	BC858
TV145	70010150	Transistor	BC848B
TV147	70010150	Transistor	BC848B
TV149	70010947	Transistor	BC858
TV154	70010150	Transistor	BC848B
TV170	A6004020	Transistor, Chip	RN1402
TV186	A6004020	Transistor, Chip	RN1402
TV187	70010150	Transistor	BC848B
TV188	70010942	Transistor	BC848
TV200	70010150	Transistor	BC848B
TV201	70010150	Transistor	BC848B
TV223	70010150	Transistor	BC848B
TV225	A6004020	Transistor, Chip	RN1402
TV227	70010150	Transistor	BC848B
TV243	70010947	Transistor	BC858
TV248	70010150	Transistor	BC848B
TV250	70010150	Transistor	BC848B
TV251	70010150	Transistor	BC848B
TW001	70010942	Transistor	BC848
TW002	A6014030	Transistor, Chip	RN2403
TW003	A6325549	Transistor	2SC2236-Y
TW005	A6325549	Transistor	2SC2236-Y
TW006	70010947	Transistor	BC858
TW008	A6325549	Transistor	2SC2236-Y
TW009	A6004050	Transistor, Chip	RN1405
TZ020	A6004020	Transistor, Chip	RN1402
TZ032	70010947	Transistor	BC858
TZ050	70010150	Transistor	BC848B
TZ051	70010949	Transistor	BC858
TZ057	70010947	Transistor	BC858
GT005	70010181	Transistor, Photo	PT493F
GT006	70010181	Transistor, Photo	PT493F
		- DIODES -	
DG030	70010342	Diode, Chip	LL4148
DG034	70010342	Diode, Chip	LL4148
DG035	70010153	Diode	1N4148
DT001	70012342	Diode	1N4001
DT002	70012342	Diode	1N4001
DT003	70012342	Diode	1N4001
DT005	70010153	Diode	1N4148
DT006	70010153	Diode	1N4148
DT008	70012342	Diode	1N4001
DT009	70011286	Diode, Zener	ZPD5. 6
DT010	70012342	Diode	1N4001
DT011	70012342	Diode	1N4001
DT012	70012342	Diode	1N4001
DT013	70010342	Diode, Chip	LL4148
DT014	70012342	Diode	1N4001
DT015	70012342	Diode	1N4001
DT018	70012342	Diode	1N4001
DV029	70010965	Diode	LL4448
DV039	70010965	Diode	LL4448
DV044	70010334	Diode	1N4448
DV048	70010965	Diode	LL4448
DV082	70010965	Diode	LL4448
DV109	70010334	Diode	1N4448
DV110	70010334	Diode	1N4448
DV123	70010340	Diode	1SS181
DV126	70010965	Diode	LL4448
DV182	70010965	Diode	LL4448
DV186	70010965	Diode	LL4448
DV202	70010965	Diode	LL4448
DW001	70011967	Diode, Zener	ZPD12
DW002	70010334	Diode	1N4448
DW005	70011440	Diode	ZP5. 1





LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CV067	70042122	Cap, Electrolytic	1 $\mu$ F	M 50V	CZ013	70041125	Cap, Chip	22nF	M 25V
CV069	70042122	Cap, Electrolytic	1 $\mu$ F	M 50V	CZ014	70041241	Cap, Electrolytic	47 $\mu$ F	M 16V
CV071	70041654	Cap, Chip	10nF	K 25V	CZ015	70041500	Cap, Electrolytic	47 $\mu$ F	M 50V
CV072	70042126	Cap, Ceramic	10nF	M 16V	CZ021	70041657	Cap, Chip	22nF	K 25V
CV074	70041328	Cap, Chip	100nF	Z 25V	CZ030	24794101	Cap, Electrolytic	100 $\mu$ F	M 16V
CV076	70041328	Cap, Chip	100nF	Z 25V	CZ033	24794101	Cap, Electrolytic	100 $\mu$ F	M 16V
CV077	70041514	Cap, Electrolytic	100 $\mu$ F	M 16V	PT001	24093962	Cap, Variable	20pF	
CV078	70041328	Cap, Chip	100nF	Z 25V			- RESISTORS -		
CV079	70042122	Cap, Electrolytic	1 $\mu$ F	M 50V	RG030	24872102	Res, Chip	1k $\Omega$	J 1/16W
CV082	24783390	Cap, Chip	39pF	J 50V	RG031	24872103	Res, Chip	10k $\Omega$	J 1/16W
CV083	70041657	Cap, Chip	22nF	K 25V	RG032	24872821	Res, Chip	820 $\Omega$	J 1/16W
CV103	70041654	Cap, Chip	10nF	K 25V	RG034	24872682	Res, Chip	6.8k $\Omega$	J 1/16W
CV106	24793101	Cap, Electrolytic	100 $\mu$ F	M 10V	RG035	24871472	Res, Chip	4.7k $\Omega$	J 1/8W
CV107	70041328	Cap, Chip	100nF	Z 25V	RG036	24871562	Res, Chip	5.6k $\Omega$	J 1/8W
CV108	70042126	Cap, Ceramic	10nF	M 16V	RG037	24871822	Res, Chip	8.2k $\Omega$	J 1/8W
CV121	70042121	Cap, Electrolytic	10 $\mu$ F	M 6.3V	RG105	70041096	Chip Jumper		
CV122	70041328	Cap, Chip	100nF	Z 25V	RG106	70041096	Chip Jumper		
CV123	70041318	Cap, Electrolytic	100 $\mu$ F	M 6.3V	RG112	70041096	Chip Jumper		
CV125	70041641	Cap, Electrolytic	10 $\mu$ F	M 50V	RN431	24872101	Res, Chip	100 $\Omega$	J 1/16W
CV126	70041328	Cap, Chip	100nF	Z 25V	RN436	70040920	Res, Carbon	1.5k $\Omega$	J 1/4W
CV127	70041522	Cap, Electrolytic	47 $\mu$ F	M 10V	RN437	24872152	Res, Chip	1.5k $\Omega$	J 1/16W
CV128	70041522	Cap, Electrolytic	47 $\mu$ F	M 10V	RN439	70041919	Res, Chip	4.7 $\Omega$	J 1/10W
CV135	70041328	Cap, Chip	100nF	Z 25V	RN440	24872563	Res, Chip	56k $\Omega$	J 1/16W
CV139	70042160	Cap, Electrolytic	100 $\mu$ F	M 6.3V	RN441	70041671	Res, Fusible	18 $\Omega$	J 0.3W
CV140	70041328	Cap, Chip	100nF	Z 25V	RN640	24872392	Res, Chip	3.9k $\Omega$	J 1/16W
CV151	24783180	Cap, Chip	180pF	J 50V	RN641	24871101	Res, Chip	100 $\Omega$	J 1/8W
CV152	70041323	Cap, Chip	8pF	C 50V	RN642	24871471	Res, Chip	470 $\Omega$	J 1/8W
CV153	70041923	Cap, Chip	75pF	J 50V	RN643	24872561	Res, Chip	560 $\Omega$	J 1/16W
CV154	24774180	Cap, Chip	18pF	J 50V	RN644	24872222	Res, Chip	2.2k $\Omega$	J 1/16W
CV155	70041096	Chip Jumper			RN645	24872103	Res, Chip	10k $\Omega$	J 1/16W
CV161	24774101	Cap, Chip	100pF	J 50V	RN646	24872392	Res, Chip	3.9k $\Omega$	J 1/16W
CV163	70042128	Cap, Chip	2.2nF	J 50V	RS030	70041919	Res, Chip	4.7 $\Omega$	J 1/10W
CV165	24774101	Cap, Chip	100pF	J 50V	RS031	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV166	70042122	Cap, Electrolytic	1 $\mu$ F	M 50V	RS035	70041096	Chip Jumper		
CV167	70041328	Cap, Chip	100nF	Z 25V	RS036	24872103	Res, Chip	10k $\Omega$	J 1/16W
CV168	70042159	Cap, Electrolytic	100 $\mu$ F	M 6.3V	RS039	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV169	70041298	Cap, Electrolytic	1 $\mu$ F	M 50V	RS040	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV170	70041699	Cap, Chip	100nF	K	RS042	70041096	Chip Jumper		
CV171	70041328	Cap, Chip	100nF	Z 25V	RS043	70041096	Chip Jumper		
CV182	70041631	Cap, Chip	22nF	K 50V	△RS045	70041671	Res, Fusible	18 $\Omega$	J 0.3W
CV184	24774680	Cap, Chip	68pF	J 50V	RS051	24872100	Res, Chip	10 $\Omega$	J 1/16W
CV189	70041631	Cap, Chip	22nF	K 50V	RT001	24872221	Res, Chip	220 $\Omega$	J 1/16W
CV200	70041328	Cap, Chip	100nF	Z 25V	RT002	70040106	Res, Carbon	10k $\Omega$	J 1/4W
CV201	70041713	Cap, Electrolytic	100 $\mu$ F	M 16V	RT003	70042163	Res, Chip	11k $\Omega$	G 1/8W
CV206	70041654	Cap, Chip	10nF	K 25V	RT004	70040702	Res, Carbon	12k $\Omega$	J 1/4W
CV212	70041654	Cap, Chip	10nF	K 25V	RT005	24871473	Res, Chip	47k $\Omega$	J 1/8W
CV213	24774180	Cap, Chip	18pF	J 50V	RT006	24871473	Res, Chip	47k $\Omega$	J 1/8W
CV214	70042117	Cap, Chip	130pF	J 50V	RT007	24872103	Res, Chip	10k $\Omega$	J 1/16W
CV215	70041325	Cap, Ceramic	91pF	J 50V	RT008	24871229	Res, Chip	2.2 $\Omega$	J 1/8W
CV219	70041328	Cap, Chip	100nF	Z 25V	RT009	24871229	Res, Chip	2.2 $\Omega$	J 1/8W
CV222	24285103	Cap, Chip	0.01 $\mu$ F	K 50V	RT010	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV224	70041654	Cap, Chip	10nF	K 25V	RT011	24872821	Res, Chip	820 $\Omega$	J 1/16W
CV226	70042130	Cap, Chip	51pF	J 50V	△RT012	24871103	Res, Chip	10k $\Omega$	J 1/8W
CV240	70041514	Cap, Electrolytic	100 $\mu$ F	M 16V	RT013	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV241	70041328	Cap, Chip	100nF	Z 25V	RT014	70042025	Res, Carbon	110k $\Omega$	J 1/4W
CV242	70042125	Cap, Ceramic	120pF	J 50V	RT015	24872114	Res, Chip	110k $\Omega$	J 1/16W
CV243	70041534	Cap, Chip	560pF	J 50V	RT017	24871201	Res, Chip	200 $\Omega$	J 1/8W
CV244	70040982	Cap, Chip	820pF	J 50V	RT018	24871201	Res, Chip	200 $\Omega$	J 1/8W
CV246	70042118	Cap, Chip	15pF	J 50V	RT019	24871103	Res, Chip	10k $\Omega$	J 1/8W
CV247	24783121	Cap, Chip	120pF	J 50V	RT020	24871103	Res, Chip	10k $\Omega$	J 1/8W
CV248	24774150	Cap, Chip	15pF	J 50V	RT021	24871102	Res, Chip	1k $\Omega$	J 1/8W
CV249	24783220	Cap, Chip	22pF	J 50V	RT022	24872182	Res, Chip	1.8k $\Omega$	J 1/16W
CV251	70041657	Cap, Chip	22nF	K 25V	RT023	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV252	70041326	Cap, Chip	56pF	J 50V	RT024	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CV254	70041328	Cap, Chip	100nF	Z 25V	RT025	24872472	Res, Chip	4.7k $\Omega$	J 1/16W
CW001	24794101	Cap, Electrolytic	100 $\mu$ F	M 16V	RT026	24872102	Res, Chip	1k $\Omega$	J 1/16W
CW005	24797100	Cap, Electrolytic	10 $\mu$ F	M 50V	RT027	70040891	Res, Carbon	470 $\Omega$	J 0.2W
CW007	70042116	Cap, Chip	47nF	K 25V	RT030	24871472	Res, Chip	4.7k $\Omega$	J 1/8W
CW025	70040738	Cap, Electrolytic	4.7 $\mu$ F	25V	RT031	24872821	Res, Chip	820 $\Omega$	J 1/16W
CY001	24783151	Cap, Chip	150pF	J 50V	RT032	24871562	Res, Chip	5.6k $\Omega$	J 1/8W
CY002	70041114	Cap, Ceramic	33nF	K 50V	RT033	24872562	Res, Chip	5.6k $\Omega$	J 1/16W
CY003	24092178	Cap, Chip	0.1 $\mu$ F	K 25V	RT034	24871273	Res, Chip	27k $\Omega$	J 1/8W
CY004	70041654	Cap, Chip	10nF	K 25V	RT035	24871223	Res, Chip	22k $\Omega$	J 1/8W
CY005	70041318	Cap, Electrolytic	100 $\mu$ F	M 6.3V	RT036	24871561	Res, Chip	560 $\Omega$	J 1/8W
CZ005	70042147	Cap, Chip	100pF	K	RT037	24871561	Res, Chip	560 $\Omega$	J 1/8W

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RT038	24871331	Res, Chip	330Ω	J 1/8W	RV120	24872104	Res, Chip	100kΩ	J 1/16W
RT039	24871331	Res, Chip	330Ω	J 1/8W	RV121	24872104	Res, Chip	100kΩ	J 1/16W
RT040	70040852	Res, Carbon	10kΩ	J 1/4W	RV122	24871332	Res, Chip	3.3kΩ	J 1/8W
RT041	24872471	Res, Chip	470Ω	J 1/16W	RV123	24872392	Res, Chip	3.9kΩ	J 1/16W
RT042	24871684	Res, Chip	680kΩ	J 1/8W	RV124	24872681	Res, Chip	680Ω	J 1/16W
RT043	24872224	Res, Chip	220kΩ	J 1/16W	RV125	24872102	Res, Chip	1kΩ	J 1/16W
RT044	24871105	Res, Chip	1MΩ	J 1/8W	RV126	24872272	Res, Chip	2.7kΩ	J 1/16W
RT045	24872105	Res, Chip	1MΩ	J 1/16W	RV127	70041096	Chip Jumper		
RT046	24872563	Res, Chip	56kΩ	J 1/16W	RV128	24872682	Res, Chip	6.8kΩ	J 1/16W
RT047	24872182	Res, Chip	1.8kΩ	J 1/16W	RV129	24872183	Res, Chip	18kΩ	J 1/16W
RT048	24872182	Res, Chip	1.8kΩ	J 1/16W	RV130	24872222	Res, Chip	2.2kΩ	J 1/16W
RT049	24872563	Res, Chip	56kΩ	J 1/16W	RV131	24872102	Res, Chip	1kΩ	J 1/16W
RT050	24872222	Res, Chip	2.2kΩ	J 1/16W	RV135	70040891	Res, Carbon	470Ω	J 0.2W
RT051	24872222	Res, Chip	2.2kΩ	J 1/16W	RV137	24871332	Res, Chip	3.3kΩ	J 1/8W
RT052	24871102	Res, Chip	1kΩ	J 1/8W	RV138	24872821	Res, Chip	820Ω	J 1/16W
RT053	70040118	Res, Carbon	4.7kΩ	J 1/4W	RV139	24872821	Res, Chip	820Ω	J 1/16W
RT055	70040101	Res, Carbon	680Ω	J	RV140	24872560	Res, Chip	56Ω	J 1/16W
RT063	24872221	Res, Chip	220Ω	J 1/16W	RV141	24872182	Res, Chip	1.8kΩ	J 1/16W
RT064	24872221	Res, Chip	220Ω	J 1/16W	RV142	24872102	Res, Chip	1kΩ	J 1/16W
RT065	24872472	Res, Chip	4.7kΩ	J 1/16W	RV143	24872103	Res, Chip	10kΩ	J 1/16W
RT066	24872472	Res, Chip	4.7kΩ	J 1/16W	RV144	70040839	Res, Carbon	100Ω	J 1/4W
RT067	24871471	Res, Chip	470Ω	J 1/8W	RV145	24872182	Res, Chip	1.8kΩ	J 1/16W
RT068	24872101	Res, Chip	100Ω	J 1/16W	RV146	24872102	Res, Chip	1kΩ	J 1/16W
RT069	24872222	Res, Chip	2.2kΩ	J 1/16W	RV147	24872682	Res, Chip	6.8kΩ	J 1/16W
RT072	24872103	Res, Chip	10kΩ	J 1/16W	RV148	24872182	Res, Chip	1.8kΩ	J 1/16W
RT073	24872473	Res, Chip	47kΩ	J 1/16W	RV150	24872102	Res, Chip	1kΩ	J 1/16W
RT074	24872303	Res, Chip	30kΩ	J 1/16W	RV151	24871102	Res, Chip	1kΩ	J 1/8W
RT075	24872102	Res, Chip	1kΩ	J 1/16W	RV154	24872102	Res, Chip	1kΩ	J 1/16W
RT081	24871101	Res, Chip	100Ω	J 1/8W	RV160	24872472	Res, Chip	4.7kΩ	J 1/16W
RT082	24871222	Res, Chip	2.2kΩ	J 1/8W	RV161	70042138	Res, Chip	130kΩ	F
RT083	24872222	Res, Chip	2.2kΩ	J 1/16W	RV163	24872474	Res, Chip	470kΩ	J 1/16W
RT084	24872182	Res, Chip	1.8kΩ	J 1/16W	RV166	24872474	Res, Chip	470kΩ	J 1/16W
RT085	24872182	Res, Chip	1.8kΩ	J 1/16W	RV167	24871272	Res, Chip	2.7kΩ	J 1/8W
RT086	24871222	Res, Chip	2.2kΩ	J 1/8W	RV168	24871682	Res, Chip	6.8kΩ	J 1/8W
RT088	24871561	Res, Chip	560Ω	J 1/8W	RV170	24872472	Res, Chip	4.7kΩ	J 1/16W
△RT089	70040122	Res, Carbon	1Ω	J 0.3W	RV171	24872223	Res, Chip	22kΩ	J 1/16W
RT090	70040099	Res, Carbon	6.8kΩ	J 1/4W	RV181	24872222	Res, Chip	2.2kΩ	J 1/16W
RT091	24872102	Res, Chip	1kΩ	J 1/16W	RV182	70041919	Res, Chip	4.7Ω	J 1/10W
RV001	24872681	Res, Chip	680Ω	J 1/16W	RV183	24871472	Res, Chip	4.7kΩ	J 1/8W
RV002	24774479	Cap, Chip	4.7pF		RV184	24872123	Res, Chip	12kΩ	J 1/16W
RV005	24872362	Res, Chip	3.6kΩ	J 1/16W	RV185	24872223	Res, Chip	22kΩ	J 1/16W
RV007	24872222	Res, Chip	2.2kΩ	J 1/16W	RV186	24872473	Res, Chip	47kΩ	J 1/16W
RV010	24871102	Res, Chip	1kΩ	J 1/8W	RV187	24872124	Res, Chip	120kΩ	J 1/16W
RV011	24872101	Res, Chip	100Ω	J 1/16W	RV188	24872102	Res, Chip	1kΩ	J 1/16W
RV020	24871102	Res, Chip	1kΩ	J 1/8W	RV189	24872124	Res, Chip	120kΩ	J 1/16W
RV021	70041096	Chip Jumper			RV190	24872104	Res, Chip	100kΩ	J 1/16W
RV022	24872472	Res, Chip	4.7kΩ	J 1/16W	RV191	24872683	Res, Chip	68kΩ	J 1/16W
RV023	24872472	Res, Chip	4.7kΩ	J 1/16W	RV192	24872103	Res, Chip	10kΩ	J 1/16W
RV026	70040118	Res, Carbon	4.7kΩ	J 1/4W	RV194	24872564	Res, Chip	560kΩ	J 1/16W
RV027	24871102	Res, Chip	1kΩ	J 1/8W	RV200	24872102	Res, Chip	1kΩ	J 1/16W
RV028	24872182	Res, Chip	1.8kΩ	J 1/16W	RV201	24872102	Res, Chip	1kΩ	J 1/16W
RV029	24871822	Res, Chip	8.2kΩ	J 1/8W	RV202	24872102	Res, Chip	1kΩ	J 1/16W
RV036	24872102	Res, Chip	1kΩ	J 1/16W	RV204	24871183	Res, Chip	18kΩ	J 1/8W
RV041	24871103	Res, Chip	10kΩ	J 1/8W	RV205	24872103	Res, Chip	10kΩ	J 1/16W
RV044	24872202	Res, Chip	2kΩ	J 1/16W	RV206	24872752	Res, Chip	7.5kΩ	J 1/16W
RV045	24872132	Res, Chip	1.3kΩ	J 1/16W	RV213	24872562	Res, Chip	5.6kΩ	J 1/16W
RV046	24872512	Res, Chip	5.1kΩ	J 1/16W	RV214	24872182	Res, Chip	1.8kΩ	J 1/16W
RV047	24872102	Res, Chip	1kΩ	J 1/16W	RV215	24872271	Res, Chip	270Ω	J 1/16W
RV048	70041096	Chip Jumper			RV221	24872183	Res, Chip	18kΩ	J 1/16W
RV049	24871272	Res, Chip	2.7kΩ	J 1/8W	RV222	24872103	Res, Chip	10kΩ	J 1/16W
RV050	70041096	Chip Jumper			RV223	24872122	Res, Chip	1.2kΩ	J 1/16W
RV051	24872471	Res, Chip	470Ω	J 1/16W	RV224	24872821	Res, Chip	820Ω	J 1/16W
RV053	24872101	Res, Chip	100Ω	J 1/16W	RV225	24871152	Res, Chip	1.5kΩ	J 1/8W
RV054	70041096	Chip Jumper			RV227	24872392	Res, Chip	3.9kΩ	J 1/16W
RV055	24872102	Res, Chip	1kΩ	J 1/16W	RV241	24871392	Res, Chip	3.9kΩ	J 1/8W
RV071	70041096	Chip Jumper			RV242	24872101	Res, Chip	100Ω	J 1/16W
RV073	70041096	Chip Jumper			RV243	24872562	Res, Chip	5.6kΩ	J 1/16W
RV074	70041093	Chip Jumper			RV244	24872561	Res, Chip	560Ω	J 1/16W
RV075	24872472	Res, Chip	4.7kΩ	J 1/16W	RV245	24872102	Res, Chip	1kΩ	J 1/16W
RV076	24872823	Res, Chip	82kΩ	J 1/16W	RV247	24872561	Res, Chip	560Ω	J 1/16W
RV077	24872102	Res, Chip	1kΩ	J 1/16W	RV248	24872332	Res, Chip	3.3kΩ	J 1/16W
RV104	70041096	Chip Jumper			RV249	24872471	Res, Chip	470Ω	J 1/16W
RV109	24872472	Res, Chip	4.7kΩ	J 1/16W	RV250	24872431	Res, Chip	430Ω	J 1/16W
RV110	24872472	Res, Chip	4.7kΩ	J 1/16W	RV251	24871132	Res, Chip	1.3kΩ	J 1/8W
RV111	24872473	Res, Chip	47kΩ	J 1/16W	RV252	24872102	Res, Chip	1kΩ	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV253	24872471	Res, Chip	470Ω	J 1/16W	JT082	70041093	Chip Jumper		
RV254	24872471	Res, Chip	470Ω	J 1/16W	JT083	70041093	Chip Jumper		
RV255	24872561	Res, Chip	560Ω	J 1/16W	JT084	70041093	Chip Jumper		
RV256	24871561	Res, Chip	560Ω	J 1/8W	JT086	70041093	Chip Jumper		
RV257	24872102	Res, Chip	1kΩ	J 1/16W	JT087	70041093	Chip Jumper		
RW001	24871472	Res, Chip	4.7kΩ	J 1/8W	JT089	70041093	Chip Jumper		
RW002	24871122	Res, Chip	1.2kΩ	J 1/8W	JT092	70041093	Chip Jumper		
RW005	24871223	Res, Chip	22kΩ	J 1/8W	JT097	70041093	Chip Jumper		
RW006	70042015	Res, Carbon	8.2kΩ	J 1/4W	JT102	70041093	Chip Jumper		
RW008	70040896	Res, Carbon	3.3kΩ	J 1/4W	JT108	70041093	Chip Jumper		
RW009	70040896	Res, Carbon	3.3kΩ	J 1/4W	JT112	70041093	Chip Jumper		
RW012	70041074	Res, Fusible	27Ω	J 0.3W	JT122	70041093	Chip Jumper		
RW017	24871472	Res, Chip	4.7kΩ	J 1/8W	JT123	24872681	Res, Chip	680Ω	J 1/16W
RW019	24871751	Res, Chip	750Ω	J 1/8W	JT124	70041093	Chip Jumper		
RW020	24871751	Res, Chip	750Ω	J 1/8W	JT128	70041093	Chip Jumper		
△RW021	70041672	Res, Fusible	5.6Ω	J 0.3W	JT129	70041093	Chip Jumper		
RW024	24871273	Res, Chip	27kΩ	J 1/8W	JT130	70041093	Chip Jumper		
RW025	24871392	Res, Chip	3.9kΩ	J 1/8W	JT132	70041093	Chip Jumper		
RW029	70042148	Res, Oxide Metal	0.51Ω		JT134	70041093	Chip Jumper		
△RW030	70041116	Res, Fusible	39Ω	J 0.3W	JT136	70041093	Chip Jumper		
RW031	70042135	Res, Carbon	560pF	J 430mW	JT148	70041093	Chip Jumper		
RW032	24871103	Res, Chip	10kΩ	J 1/8W	JT161	70041093	Chip Jumper		
RW033	24871332	Res, Chip	3.3kΩ	J 1/8W	JT171	70041096	Chip Jumper		
RY001	24872222	Res, Chip	2.2kΩ	J 1/16W	JT174	70041096	Chip Jumper		
RY002	24872105	Res, Chip	1MΩ	J 1/16W	JT175	70041096	Chip Jumper		
RY003	70041799	Res, Chip	820kΩ	J 1/10W	JT176	70041096	Chip Jumper		
RY004	70041783	Res, Chip	5.1kΩ	J 1/10W	JT177	70041096	Chip Jumper		
RY006	24871104	Res, Chip	100kΩ	J 1/8W	JT179	70041096	Chip Jumper		
RY007	70040348	Res, Chip	100Ω	J 1/16W	JT190	70041093	Chip Jumper		
RY010	24872125	Res, Chip	1.2MΩ	J 1/16W	JT191	70041093	Chip Jumper		
RY011	70041799	Res, Chip	820kΩ	J 1/10W	JT192	70041093	Chip Jumper		
RZ007	24872221	Res, Chip	220Ω	J 1/16W	JT193	70041093	Chip Jumper		
RZ008	24872221	Res, Chip	220Ω	J 1/16W	JT194	70041093	Chip Jumper		
RZ015	70040961	Res, Carbon	1kΩ	J 1/4W	JT203	70041093	Chip Jumper		
RZ020	24871222	Res, Chip	2.2kΩ	J 1/8W	JT206	70041096	Chip Jumper		
RZ030	24872911	Res, Chip	910Ω	J 1/16W	JT209	70041096	Chip Jumper		
RZ031	24872102	Res, Chip	1kΩ	J 1/16W	JT212	70041093	Chip Jumper		
RZ035	70041096	Chip Jumper			JT213	70041093	Chip Jumper		
RZ037	24871152	Res, Chip	1.5kΩ	J 1/8W	JT214	70041093	Chip Jumper		
RZ050	24872681	Res, Chip	680Ω	J 1/16W	JT215	70041096	Chip Jumper		
RZ051	70041094	Res, Chip	130Ω	J	JT217	70041093	Chip Jumper		
RZ052	24871471	Res, Chip	470Ω	J 1/8W	JV001	70041093	Chip Jumper		
RZ053	24872331	Res, Chip	330Ω	J 1/16W	JV023	70041093	Chip Jumper		
RZ054	24871102	Res, Chip	1kΩ	J 1/8W	JV037	70041093	Chip Jumper		
RZ055	24871102	Res, Chip	1kΩ	J 1/8W	JV043	70041093	Chip Jumper		
RZ056	70041096	Chip Jumper			JV056	70041093	Chip Jumper		
RZ057	24871472	Res, Chip	4.7kΩ	J 1/8W	JV058	70041096	Chip Jumper		
RZ060	24872270	Res, Chip	27Ω	J 1/16W	JV060	70041093	Chip Jumper		
RZ065	70041660	Res, Carbon	100Ω	J 0.43W	JV061	70041093	Chip Jumper		
RZ066	70041658	Res, Carbon	82Ω	J 1/4W	JV062	70041093	Chip Jumper		
JG036	70041096	Chip Jumper			JV065	70041093	Chip Jumper		
JN401	70041096	Chip Jumper			JV066	70041093	Chip Jumper		
JN603	70041093	Chip Jumper			JV068	70041093	Chip Jumper		
JS031	70041093	Chip Jumper			JV069	70041093	Chip Jumper		
JS032	70041093	Chip Jumper			JV070	70041093	Chip Jumper		
JS036	70041093	Chip Jumper			JV071	70041093	Chip Jumper		
JS037	70041093	Chip Jumper			JV074	70041093	Chip Jumper		
JS043	70041093	Chip Jumper			JV075	70041093	Chip Jumper		
JS050	70041093	Chip Jumper			JV076	70041093	Chip Jumper		
JS051	70041093	Chip Jumper			JV077	70041093	Chip Jumper		
JT001	70041093	Chip Jumper			JV078	70041093	Chip Jumper		
JT018	70041093	Chip Jumper			JV089	70041093	Chip Jumper		
JT019	70041093	Chip Jumper			JV090	70041093	Chip Jumper		
JT020	70041093	Chip Jumper			JV094	70041093	Chip Jumper		
JT023	70041093	Chip Jumper			JV095	70041093	Chip Jumper		
JT031	70041093	Chip Jumper			JV101	70041093	Chip Jumper		
JT033	70041093	Chip Jumper			JV117	70041096	Chip Jumper		
JT035	70040103	Res, Carbon	1kΩ	J 1/4W	JV123	70041093	Chip Jumper		
JT036	70041093	Chip Jumper			JV126	70041096	Chip Jumper		
JT038	70041096	Chip Jumper			JV129	70041096	Chip Jumper		
JT051	70041093	Chip Jumper			JV130	70041096	Chip Jumper		
JT056	70041096	Chip Jumper			JV131	70041096	Chip Jumper		
JT066	70041093	Chip Jumper			JV140	70041093	Chip Jumper		
JT079	70041093	Chip Jumper			JV145	70041093	Chip Jumper		
JT080	70041096	Chip Jumper			JV155	70041093	Chip Jumper		



LOCATION NUMBER	PART NUMBER	DESCRIPTION
--------------------	----------------	-------------

JV156	70041093	Chip Jumper
JV158	70041096	Chip Jumper
JV159	70041093	Chip Jumper
JV162	70041093	Chip Jumper
JW009	70041093	Chip Jumper
JW015	70041093	Chip Jumper
JW019	70041093	Chip Jumper
JW026	70041093	Chip Jumper
JW027	70041093	Chip Jumper
JW041	70041093	Chip Jumper
JY006	70041093	Chip Jumper
JY007	70041093	Chip Jumper
JY008	70041093	Chip Jumper
JY009	70041093	Chip Jumper
JY010	70041093	Chip Jumper
JY011	70041093	Chip Jumper
JZ007	70041093	Chip Jumper
JZ008	70041093	Chip Jumper
JZ009	70041093	Chip Jumper
JZ015	70041093	Chip Jumper
JZ017	70041093	Chip Jumper
JZ020	70041093	Chip Jumper
JZ022	70041096	Chip Jumper
JZ030	70041093	Chip Jumper
JZ040	70041093	Chip Jumper
JZ041	70041093	Chip Jumper
JZ042	70041093	Chip Jumper
JZ045	70041093	Chip Jumper
JZ048	70041659	Res, Carbon 220Ω J 1/4W
JZ049	70041659	Res, Carbon 220Ω J 1/4W
JZ053	70041093	Chip Jumper
JZ062	70041096	Chip Jumper
PS034	70042164	Res, Variable 33kΩ 1/10W
- MISCELLANEOUS -		
0010M	70011844	Tuner
0020M	70011845	IF Module
BS001	23164506	Plug 2P
BT001	70011830	Connector
FZ050	70012166	Filter 5.74MHz
FZ051	70011260	Filter
GT001	70011828	Hall Sensor HW300B
GT003	70011793	Photo Interrupter GP1S562
GT004	70011793	Photo Interrupter GP1S562
GT02A	70051136	LED Holder
MT001	70031317	Stator
QT001	70011961	Crystal 17.734MHz
QT002	70010116	Crystal, 32kHz
QT003	70011861	Crystal 16MHz
QV028	70011960	Crystal 4.433619MHz
ST001	70011826	Switch, Push

0030M	70090915	P C Board Assy TMB
- INTEGRATED CIRCUITS -		
IN001	70012438	IC MSP3410
IN002	70012439	IC TA75557P
IN003	70012439	IC TA75557P
IN004	70012439	IC TA75557P
IN005	70011896	IC BA3129F
IN006	70011806	IC BA7755
IN007	70011898	IC TA8863AF
IX101	70011881	IC STV6400
- TRANSISTORS -		
TN001	A6004040	Transistor, Chip RN1404
TN002	70010331	Transistor BC847B
TN003	70010331	Transistor BC847B
TN004	70010331	Transistor BC847B
TN300	A6541130	Transistor, Chip 2SA1162-Y
TN302	A6541130	Transistor, Chip 2SA1162-Y

- DIODES -		
DN001	70010342	Diode, Chip LL4148
DN002	70010965	Diode LL4448
DN003	70010965	Diode LL4448
DN150	70010342	Diode, Chip LL4148
DN151	70010342	Diode, Chip LL4148
DN300	70010340	Diode 1SS181

LOCATION NUMBER	PART NUMBER	DESCRIPTION
--------------------	----------------	-------------

- COILS -		
LN001	70011771	Coil, Peaking
LN003	70012095	Coil, Peaking
LN004	70011771	Coil, Peaking
LN300	23289121	Coil, Peaking TRF4121AF
LN301	23237729	Coil, Peaking TRF4822AP
LX101	70011848	Coil, Peaking
LX102	70011848	Coil, Peaking
LX103	70011772	Coil, Peaking
LX105	70012431	Coil, Chip
- CAPACITORS -		
CN090	24092293	Cap, Chip 0.1μF Z 25V
CN096	70041530	Cap, Chip 330nF Z 16V
CN097	70041530	Cap, Chip 330nF Z 16V
CN098	70041530	Cap, Chip 330nF Z 16V
CN099	70041530	Cap, Chip 330nF Z 16V
CN100	70041131	Cap, Chip 390pF J 50V
CN101	70041131	Cap, Chip 390pF J 50V
CN102	70041271	Cap, Chip 2.2nF K 50V
CN103	70041271	Cap, Chip 2.2nF K 50V
CN104	70041271	Cap, Chip 2.2nF K 50V
CN105	70041271	Cap, Chip 2.2nF K 50V
CN106	70041649	Cap, Chip 0.68μF Z 50V
CN107	70041649	Cap, Chip 0.68μF Z 50V
CN109	70041530	Cap, Chip 330nF Z 16V
CN110	70041530	Cap, Chip 330nF Z 16V
CN111	70041530	Cap, Chip 330nF Z 16V
CN112	70041530	Cap, Chip 330nF Z 16V
CN113	70041042	Cap, Electrolytic 10μF X
CN114	70040493	Cap, Chip 10nF K 50V
CN115	24633220	Cap, Electrolytic 22μF M 16V
CN120	70041889	Cap, Electrolytic 220μF M 16V
CN121	70040493	Cap, Chip 10nF K 50V
CN122	24093962	Cap, Variable 20pF
CN123	70041274	Cap, Chip 27pF
CN126	70040493	Cap, Chip 10nF K 50V
CN127	70040493	Cap, Chip 10nF K 50V
CN128	70040493	Cap, Chip 10nF K 50V
CN129	70040493	Cap, Chip 10nF K 50V
CN130	24633220	Cap, Electrolytic 22μF M 16V
CN131	70041130	Cap, Chip 470nF Z 16V
CN132	70041042	Cap, Electrolytic 10μF X
CN134	70042010	Cap, Chip 0.1μF Z
CN135	70041530	Cap, Chip 330nF Z 16V
CN136	70041530	Cap, Chip 330nF Z 16V
CN137	70041530	Cap, Chip 330nF Z 16V
CN138	70041530	Cap, Chip 330nF Z 16V
CN139	70041706	Cap, Chip 470pF J 50V
CN140	70041706	Cap, Chip 470pF J 50V
CN141	70041294	Cap, Electrolytic 33μF M 16V
CN142	70042010	Cap, Chip 0.1μF Z
CN143	70041042	Cap, Electrolytic 10μF X
CN144	70040493	Cap, Chip 10nF K 50V
CN145	24633220	Cap, Electrolytic 22μF M 16V
CN146	70041042	Cap, Electrolytic 10μF X
CN147	70041530	Cap, Chip 330nF Z 16V
CN148	70041530	Cap, Chip 330nF Z 16V
CN150	70041264	Cap, Chip 150pF
CN151	70041306	Cap, Electrolytic 10μF M 16V
CN152	70041306	Cap, Electrolytic 10μF M 16V
CN153	70041264	Cap, Chip 150pF
CN154	70041051	Cap, Electrolytic 47μF M 16V
CN155	70042010	Cap, Chip 0.1μF Z
CN156	70041051	Cap, Electrolytic 47μF M 16V
CN161	70041933	Cap, Chip 1.2nF K 50V
CN162	70041649	Cap, Chip 0.68μF Z 50V
CN163	24794470	Cap, Electrolytic 47μF M 16V
CN165	70041933	Cap, Chip 1.2nF K 50V
CN170	70041530	Cap, Chip 330nF Z 16V
CN172	70041933	Cap, Chip 1.2nF K 50V
CN173	24794101	Cap, Electrolytic 100μF M 16V
CN174	70040493	Cap, Chip 10nF K 50V
CN176	70042133	Cap, Chip 3.9nF K 50V
CN177	24794470	Cap, Electrolytic 47μF M 16V
CN181	70041933	Cap, Chip 1.2nF K 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CN182	24794470	Cap, Electrolytic	47 $\mu$ F	M 16V	CX105	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN184	70041933	Cap, Chip	1.2nF	K 50V	CX106	70041051	Cap, Electrolytic	47 $\mu$ F	M 16V
CN185	70041376	Cap, Chip	10nF	Z 50V	CX108	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN186	24794101	Cap, Electrolytic	100 $\mu$ F	M 16V	CX109	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN190	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	CX110	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN191	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	CX111	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN300	70040721	Cap, Electrolytic	22 $\mu$ F	M 16V	CX112	70041051	Cap, Electrolytic	47 $\mu$ F	M 16V
CN303	24206478	Cap, Electrolytic	0.47 $\mu$ F	M 50V	CX113	70042010	Cap, Chip	0.1 $\mu$ F	Z
CN304	24206478	Cap, Electrolytic	0.47 $\mu$ F	M 50V	CX114	70041468	Cap, Chip	100nF	Z 25V
CN305	70041934	Cap, Chip	3.3nF	K 50V	CX115	70040241	Cap, Ceramic, Chip	47pF	J 50V
CN306	70041934	Cap, Chip	3.3nF	K 50V	CX116	70040609	Cap, Chip	100pF	J 50V
CN307	24630852	Cap, Electrolytic	22 $\mu$ F	M 16V	- RESISTORS -				
CN308	70042120	Cap, Electrolytic	330 $\mu$ F	M 6.3V	RN090	70041783	Res, Chip	5.1k $\Omega$	J 1/10W
CN309	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN098	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN310	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN099	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN311	24591103	Cap, Plastic	0.01 $\mu$ F	J 50V	RN100	70041138	Res, Chip	5.6k $\Omega$	J 1/10W
CN312	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN101	70041879	Res, Chip	30k $\Omega$	J 1/10W
CN313	24591103	Cap, Plastic	0.01 $\mu$ F	J 50V	RN102	70041879	Res, Chip	30k $\Omega$	J 1/10W
CN314	24591103	Cap, Plastic	0.01 $\mu$ F	J 50V	RN103	70041173	Res, Chip	100k $\Omega$	J 1/10W
CN315	70040721	Cap, Electrolytic	22 $\mu$ F	M 16V	RN104	70041386	Res, Chip	180k $\Omega$	J 1/10W
CN316	70040721	Cap, Electrolytic	22 $\mu$ F	M 16V	RN105	70041386	Res, Chip	180k $\Omega$	J 1/10W
CN319	70040493	Cap, Chip	10nF	K 50V	RN106	70040391	Chip Jumper		
CN320	70042120	Cap, Electrolytic	330 $\mu$ F	M 6.3V	RN107	70040391	Chip Jumper		
CN321	70040493	Cap, Chip	10nF	K 50V	RN108	70040336	Res, Chip	68k $\Omega$	J 1/16W
CN322	70041578	Cap, Electrolytic	220nF	M 50V	RN109	70040391	Chip Jumper		
CN323	70040242	Cap, Ceramic, Chip	68pF	J 50V	RN110	70040391	Chip Jumper		
CN324	70041932	Cap, Chip	150nF	K	RN111	70040358	Res, Chip	10k $\Omega$	J 1/16W
CN325	70041298	Cap, Electrolytic	1 $\mu$ F	M 50V	RN112	70040350	Res, Chip	220 $\Omega$	J 1/16W
CN326	70040246	Cap, Ceramic, Chip	270pF	J 50V	RN113	70040339	Res, Chip	330 $\Omega$	J 1/16W
CN327	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN114	70040348	Res, Chip	100 $\Omega$	J 1/16W
CN328	24591103	Cap, Plastic	0.01 $\mu$ F	J 50V	RN115	70040391	Chip Jumper		
CN329	70041042	Cap, Electrolytic	10 $\mu$ F	X	RN116	70040363	Res, Chip	47k $\Omega$	J 1/16W
CN330	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN117	70040358	Res, Chip	10k $\Omega$	J 1/16W
CN331	70040493	Cap, Chip	10nF	K 50V	RN118	70040391	Chip Jumper		
CN332	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN119	70041464	Res, Chip	150 $\Omega$	J 1/10W
CN333	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN120	70040570	Res, Chip	470 $\Omega$	J 1/16W
CN334	70042132	Cap, Chip	560pF	K	RN121	70040570	Res, Chip	470 $\Omega$	J 1/16W
CN335	70042124	Cap, Electrolytic	470nF	M 50V	RN122	70040391	Chip Jumper		
CN336	70041934	Cap, Chip	3.3nF	K 50V	RN123	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN338	24815153	Cap, Chip	0.015 $\mu$ F	K 50V	RN124	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN339	70041953	Cap, Chip	18nF	K 50V	RN125	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN340	70040738	Cap, Electrolytic	4.7 $\mu$ F	25V	RN126	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN341	24092293	Cap, Chip	0.1 $\mu$ F	Z 25V	RN127	70040391	Chip Jumper		
CN342	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN129	70040391	Chip Jumper		
CN343	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN130	70040391	Chip Jumper		
CN344	70042005	Cap, Chip	200pF	J 50V	RN134	70040391	Chip Jumper		
CN345	70041572	Cap, Electrolytic	330 $\mu$ F	M 10V	RN135	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN346	24633220	Cap, Electrolytic	22 $\mu$ F	M 16V	RN136	70040571	Res, Chip	12k $\Omega$	J 1/16W
CN347	70040268	Cap, Ceramic, Chip	22nF	K 25V	RN138	70040358	Res, Chip	10k $\Omega$	J 1/16W
CN348	70041530	Cap, Chip	330nF	Z 16V	RN139	70040358	Res, Chip	10k $\Omega$	J 1/16W
CN349	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN140	70040361	Res, Chip	27k $\Omega$	J 1/16W
CN350	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN142	70040360	Res, Chip	18k $\Omega$	J 1/16W
CN355	24203100	Cap, Electrolytic	10 $\mu$ F	M 16V	RN143	70041387	Res, Chip	220k $\Omega$	J 1/10W
CN356	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN144	70041387	Res, Chip	220k $\Omega$	J 1/10W
CN357	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN145	70041387	Res, Chip	220k $\Omega$	J 1/10W
CN360	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN146	70041387	Res, Chip	220k $\Omega$	J 1/10W
CN361	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN147	70040360	Res, Chip	18k $\Omega$	J 1/16W
CN370	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN148	70040361	Res, Chip	27k $\Omega$	J 1/16W
CN371	70041649	Cap, Chip	0.68 $\mu$ F	Z 50V	RN149	70040135	Res, Chip	12k $\Omega$	J 1/8W
CN375	70041376	Cap, Chip	10nF	Z 50V	RN150	70040358	Res, Chip	10k $\Omega$	J 1/16W
CN376	70041376	Cap, Chip	10nF	Z 50V	RN155	70040358	Res, Chip	10k $\Omega$	J 1/16W
CX001	70042132	Cap, Chip	560pF	K	RN156	70040335	Res, Chip	2.7k $\Omega$	J 1/16W
CX002	70042132	Cap, Chip	560pF	K	RN157	70040367	Res, Chip	120k $\Omega$	J 1/16W
CX003	70041472	Cap, Chip	1nF	K 50V	RN158	70040354	Res, Chip	1k $\Omega$	J 1/16W
CX004	70041472	Cap, Chip	1nF	K 50V	RN159	70040373	Res, Chip	4.7k $\Omega$	J 1/16W
CX005	70042132	Cap, Chip	560pF	K	RN160	70040372	Res, Chip	3.3k $\Omega$	J 1/16W
CX006	70042132	Cap, Chip	560pF	K	RN161	70040335	Res, Chip	2.7k $\Omega$	J 1/16W
CX007	70041472	Cap, Chip	1nF	K 50V	RN162	70040373	Res, Chip	4.7k $\Omega$	J 1/16W
CX008	70041472	Cap, Chip	1nF	K 50V	RN163	70040133	Res, Chip	1k $\Omega$	J 1/8W
CX009	70042132	Cap, Chip	560pF	K	RN164	70040367	Res, Chip	120k $\Omega$	J 1/16W
CX016	70042132	Cap, Chip	560pF	K	RN165	70040335	Res, Chip	2.7k $\Omega$	J 1/16W
CX020	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN166	70040358	Res, Chip	10k $\Omega$	J 1/16W
CX021	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN170	70040354	Res, Chip	1k $\Omega$	J 1/16W
CX022	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN171	70040354	Res, Chip	1k $\Omega$	J 1/16W
CX023	70040262	Cap, Ceramic, Chip	100pF	J 50V	RN172	70040373	Res, Chip	4.7k $\Omega$	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RN173	70040367	Res, Chip	120kΩ	J 1/16W	RX013	70040570	Res, Chip	470Ω	J 1/16W
RN174	70040358	Res, Chip	10kΩ	J 1/16W	RX014	70040570	Res, Chip	470Ω	J 1/16W
RN175	70040367	Res, Chip	120kΩ	J 1/16W	RX017	70040391	Chip Jumper		
RN177	70040358	Res, Chip	10kΩ	J 1/16W	RX019	70040391	Chip Jumper		
RN178	70040354	Res, Chip	1kΩ	J 1/16W	RX104	70040348	Res, Chip	100Ω	J 1/16W
RN179	70040391	Chip Jumper			RX105	70041169	Res, Chip	68Ω	J 1/10W
RN180	70040358	Res, Chip	10kΩ	J 1/16W	RX106	70041441	Res, Chip	75Ω	J 1/10W
RN181	70042145	Res, Chip	3. 6kΩ	J 1/16W	RX112	70041169	Res, Chip	68Ω	J 1/10W
RN182	70040367	Res, Chip	120kΩ	J 1/16W	RX113	70041441	Res, Chip	75Ω	J 1/10W
RN183	70040354	Res, Chip	1kΩ	J 1/16W	RX114	70040348	Res, Chip	100Ω	J 1/16W
RN184	70040373	Res, Chip	4. 7kΩ	J 1/16W	JX103	70040391	Chip Jumper		
RN185	70040367	Res, Chip	120kΩ	J 1/16W	JX104	70040391	Chip Jumper		
RN186	70042145	Res, Chip	3. 6kΩ	J 1/16W	JX105	70040391	Chip Jumper		
RN187	70040358	Res, Chip	10kΩ	J 1/16W	JX107	70040391	Chip Jumper		
RN188	70040373	Res, Chip	4. 7kΩ	J 1/16W	JX109	70040391	Chip Jumper		
RN189	70040354	Res, Chip	1kΩ	J 1/16W	ZN002	70040391	Chip Jumper		
RN190	70040350	Res, Chip	220Ω	J 1/16W	ZN003	70040391	Chip Jumper		
RN191	70040350	Res, Chip	220Ω	J 1/16W	ZN005	70040391	Chip Jumper		
RN195	70040350	Res, Chip	220Ω	J 1/16W	ZN006	70040391	Chip Jumper		
RN196	70040350	Res, Chip	220Ω	J 1/16W	ZN007	70040391	Chip Jumper		
RN300	70040351	Res, Chip	390Ω	J 1/16W	ZN008	70040391	Chip Jumper		
RN301	70040351	Res, Chip	390Ω	J 1/16W	ZN009	70040391	Chip Jumper		
RN302	70040391	Chip Jumper			ZN010	70040391	Chip Jumper		
RN303	70040391	Chip Jumper			ZN011	70040391	Chip Jumper		
RN304	70041166	Res, Chip	1MΩ	J 1/8W	ZN012	70040391	Chip Jumper		
RN305	70040335	Res, Chip	2. 7kΩ	J 1/16W	ZN013	70040391	Chip Jumper		
RN306	70040356	Res, Chip	1. 8kΩ	J 1/16W	ZN014	70040391	Chip Jumper		
RN307	70041464	Res, Chip	150Ω	J 1/10W	ZN015	70040391	Chip Jumper		
RN308	70040337	Res, Chip	270Ω	J 1/16W	ZN017	70040391	Chip Jumper		
RN309	70040357	Res, Chip	22kΩ	J 1/16W	ZN018	70040391	Chip Jumper		
RN310	70041801	Res, Chip	11kΩ	J 1/10W	ZN020	70040391	Chip Jumper		
RN311	70041138	Res, Chip	5. 6kΩ	J 1/10W	ZN021	70040391	Chip Jumper		
RN312	70041478	Res, Chip	330kΩ	J 1/10W			- MISCELLANEOUS -		
RN313	70041170	Res, Chip	180Ω	J 1/10W	BN002	23164506	Plug 2P		
RN314	70040335	Res, Chip	2. 7kΩ	J 1/16W	BN391	70060759	Phono Jack		
RN315	70040362	Res, Chip	33kΩ	J 1/16W	BN393	70012358	Pin Jack		
RN316	70041801	Res, Chip	11kΩ	J 1/10W	FN001	70011863	Filter	ZJK5103D	
RN317	70041170	Res, Chip	180Ω	J 1/10W	FN002	70011863	Filter	ZJK5103D	
RN318	70040391	Chip Jumper			FN003	70011863	Filter	ZJK5103D	
RN319	70041138	Res, Chip	5. 6kΩ	J 1/10W	FN004	70011863	Filter	ZJK5103D	
RN320	24872243	Res, Chip	24kΩ	J 1/16W	QN001	70011858	Crystal	18. 432MHz	
RN321	70040361	Res, Chip	27kΩ	J 1/16W	ZN001	70011998	Filter	6. 5MHz	
RN323	70041173	Res, Chip	100kΩ	J 1/10W					
RN324	70041173	Res, Chip	100kΩ	J 1/10W					
RN325	70041950	Res, Chip	51kΩ	J 1/10W					
RN326	70041199	Res, Chip	1MΩ	J 1/10W					
RN327	70040358	Res, Chip	10kΩ	J 1/16W					
RN329	70040372	Res, Chip	3. 3kΩ	J 1/16W					
RN330	70040335	Res, Chip	2. 7kΩ	J 1/16W					
RN331	70040372	Res, Chip	3. 3kΩ	J 1/16W					
RN332	70040335	Res, Chip	2. 7kΩ	J 1/16W					
RN340	70040391	Chip Jumper							
RN341	70040361	Res, Chip	27kΩ	J 1/16W					
RN342	70040681	Res, Chip	33kΩ	J 1/8W					
RN343	70040361	Res, Chip	27kΩ	J 1/16W					
RN344	70040362	Res, Chip	33kΩ	J 1/16W					
RN345	70040361	Res, Chip	27kΩ	J 1/16W					
RN346	70040362	Res, Chip	33kΩ	J 1/16W					
RN347	70040361	Res, Chip	27kΩ	J 1/16W					
RN348	70040362	Res, Chip	33kΩ	J 1/16W					
RN357	70040335	Res, Chip	2. 7kΩ	J 1/16W					
RN365	70040391	Chip Jumper							
RN366	70040570	Res, Chip	470Ω	J 1/16W					
RN370	70040349	Res, Chip	120Ω	J 1/16W					
RN371	70040349	Res, Chip	120Ω	J 1/16W					
RX001	70040348	Res, Chip	100Ω	J 1/16W					
RX002	70040348	Res, Chip	100Ω	J 1/16W					
RX003	70040348	Res, Chip	100Ω	J 1/16W					
RX004	70040348	Res, Chip	100Ω	J 1/16W					
RX007	70040348	Res, Chip	100Ω	J 1/16W					
RX008	70040348	Res, Chip	100Ω	J 1/16W					
RX009	70040348	Res, Chip	100Ω	J 1/16W					
RX010	70040348	Res, Chip	100Ω	J 1/16W					
RX011	70040348	Res, Chip	100Ω	J 1/16W					
RX012	70040348	Res, Chip	100Ω	J 1/16W					

# SPECIFICATIONS

Format	: VHS standard
Recording system	: Rotary, 2-head helical scan system
Video heads	: 4 heads
Video signal system	: CCIR; 625 lines, 50 fields, PAL/SECAM colour signal NTSC colour, 525 lines
Tape speed	: SP : 23.39 mm/s (PAL/MESECAM)      SP : 33.35 mm/s (NTSC) LP : 11.70 mm/s (PAL/MESECAM)      SLP : 11.12 mm/s (NTSC)
Recording time	: SP : 240 minutes with E240 cassettes (PAL/MESECAM) LP : 480 minutes with E240 cassettes (PAL/MESECAM)
Winding time	: Approx. 110 seconds with E180 cassettes
Dimensions	: 370 (W) × 89 (H) × 307 (D) mm
Mass	: 4.2 kg
Operating temperature	: +5 to +40°C
Operating humidity	: Less than 80% RH
Mains power	: 230 V AC, 50 Hz
Power consumption	: 24 W (in operation)

## CONNECTORS

Aerial input	: 75 Ω coaxial
Aerial output	: 75 Ω coaxial
Video input	: IN 1/OUT SCART socket, 1.0 V(p-p), 75 Ω LINE IN 2 VIDEO Phono type jack, 1.0 V(p-p), 75 Ω
Audio input	: IN 1/OUT SCART socket, 308 mV(rms), more than 10 kΩ LINE IN 2 AUDIO Phono type jack, 308 mV(rms), more than 47 kΩ
Video output	: IN 1/OUT SCART socket, 1.0 V(p-p), 75 Ω
Audio output	: IN 1/OUT SCART socket, 308 mV(rms), less than 1.0 kΩ AUDIO OUT Phono type jacks, 308 mV(rms), less than 4.7 kΩ

## VIDEO

Signal-to-noise ratio	: More than 43 dB (SP tape speed/PAL)
-----------------------	---------------------------------------

## AUDIO

Signal-to-noise ratio	: More than 42 dB (SP tape speed/PAL/normal mono)
Frequency range	: 20 Hz to 20,000 Hz
Dynamic range	: More than 90 dB (Hi-Fi mode)
Audio track	: 1 track (Normal-mono), 2 channels (Hi-Fi sound)

## TIMER

Clock	: 24-hour digital indication
No. of events	: 4 events 1 month

## TUNER

System	: Frequency synthesizer
Channel coverage	: PAL SECAM B/G    VHF: E2 – E12, A – H, H1, H2, R1 – R12 UHF: E21 – E69 CATV: X – Z, S1 – S41 SECAM D/K    VHF: R1 – R12, A – H, H1, H2, E2 – E12 UHF: E21 – E69 CATV: X – Z, S1 – S41

RF converter	: UHF channel 60 (53 – 67, adjustable)
--------------	--

Accessories	: Aerial cable ..... 1
	Remote control unit ..... 1
	Batteries (R03) ..... 2
	Power cable ..... 1

Designs and specifications are subject to change without notice.

# **TOSHIBA CORPORATION**

1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-01, JAPAN